



**RESOURCE MANAGEMENT PLAN
FOR
CITY OF ROCKS NATIONAL RESERVE**
(Initiated 1994)

This plan is approved by *Michael Jackson* Date: 12-18-96
(CRO Superintendent)

RESOURCES MANAGEMENT PLAN FOR CITY OF ROCKS NATIONAL RESERVE

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LIST OF RESOURCE MANAGEMENT PROJECT STATEMENTS

RESOURCES MANAGEMENT PROGRAM ADMINISTRATION and SUPPORT

Resources Program Management: 001 - 059

Program Management:

CIRO-I-001.000	Input natural and cultural resource information into planning documents
CIRO-I-002.000	Conduct compliance for management actions
CIRO-I-003.000	Resource management reporting and program management
CIRO-I-004.000	Review and update the Resources Management Plan
CIRO-I-005.000	Correlate RMP project statements to 10-237s, 10-238s, and Combined Program Call
CIRO-I-006.000	Assess natural/cultural resources and management workload (R-MAP)
CIRO-I-007.000	Assess performance standards for resource management
CIRO-I-008.000	Develop RNA Management Plan

Professional Development:

CIRO-I-020.000	Develop and implement a Resources Management Training Program for reserve staff
CIRO-I-021.000	Identify and provide training needs for cooperators

Partnerships:

CIRO-I-030.000	Identify, develop and maintain partnerships (grazing, IPM, network of information-sharing, research)
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Research:

CIRO-I-040.000	Identify research needs
CIRO-I-041.000	Develop and administer research program
CIRO-I-042.000	Collaborate with National Biological Survey, other agencies, and universities

Information Management: 060 - 099

Data Acquisition and Maintenance:

CIRO-I-060.000	Obtain cyclic aerial photography
CIRO-C-061.000	Develop cultural resource library
CIRO-N-062.000	Develop natural resource library

Geographic Information System:

CIRO-I-080.000	Develop and maintain Geographic Information System (numeric and graphic databases)
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CULTURAL RESOURCES

Historic Resources: 100 - 149

Inventory and Evaluate Historic Resources:

- CIRO-C-100.000 Develop list of classified structures
- CIRO-C-101.000 Develop cultural sites inventory

Historic Documentation:

- CIRO-C-120.000 Complete a Historic Resources Study
- CIRO-C-121.000 Prepare amendments to the National Register Nomination
- CIRO-C-122.000 Complete an Administrative History
- CIRO-C-123.000 Conduct oral history projects

Archeological Resources: 150 - 199

Inventory and Evaluate Prehistoric & Historic Archeological Resources:

- CIRO-C-150.000 Complete archeological inventory and document remnants of California Trail
- CIRO-C-151.000 Evaluate archeological resources and prepare National Register nominations for significant sites
- CIRO-C-152.000 Document historic inscriptions
- CIRO-C-153.000 Document historic mining sites
- CIRO-C-154.000 Locate and document historic homestead sites
- CIRO-C-155.000 Provide maps of archeological/historic sites already surveyed

Manage Archeological Resources:

- CIRO-I-180.000 Develop treatments for stabilization and protection of historic inscriptions
- CIRO-I-181.000 Stabilize and protect remnants associated with historic homesteads
- CIRO-I-182.000 Stabilize remnants/ruts of California Trail

Ethnographic Resources: 200 - 249

Identify and Evaluate Ethnographic Resources:

- CIRO-C-200.000 Conduct ethnographic overview and assessment
- CIRO-C-201.000 Conduct cultural affiliations study
- CIRO-C-202.000 Conduct ethnographic investigations to determine the cultural significance of Twin Sisters
- CIRO-C-203.000 Develop an Ethnographic Research Plan
- CIRO-I-204.000 Identify and evaluate traditional cultural properties

Manage Ethnographic Resources:

- CIRO-C-230.000 Establish staff operating procedures for integrating consultation in all management activities
- CIRO-C-231.000 Develop and implement a Consultation Plan

Museum Collections: 250 - 299

Document Museum Collections:

CIRO-C-250.000	Prepare Scope of Collection Statement
CIRO-C-251.000	Catalogue museum collection
CIRO-C-252.000	Research and collect materials from non-NPS collections
CIRO-C-253.000	Establish park archives
CIRO-C-254.000	Develop reference library
CIRO-I-255.000	Identify and document natural history specimens

Preservation/Storage of Museum Collections:

CIRO-I-280.000	Develop Collection Management Plan
CIRO-C-281.000	Develop Collection Storage Plan
CIRO-C-282.000	Purchase museum storage and security equipment
CIRO-C-283.000	Preserve historic records/photographs/maps

Cultural/Historic Landscapes: 300 - 349

Identify and Evaluate Cultural Landscapes:

CIRO-C-300.000	Complete Cultural Landscape Inventory
CIRO-C-301.000	Identify significant historic views and viewsheds

Manage Cultural Landscapes:

CIRO-I-330.000	Prepare Cultural Landscape Report(s)
CIRO-I-333.000	Develop and implement California Trail Management Plan, with follow-up monitoring
CIRO-I-333.001	Define critical cultural resource elements in California Trail corridor
CIRO-I-333.002	Identify important related features/elements outside of the ½-mile corridor
CIRO-I-333.003	Carry out resource inventories
CIRO-I-333.004	Rehabilitate eroded areas as appropriate
CIRO-I-333.005	Manage vegetation as appropriate
CIRO-I-333.006	Develop design guidelines for acceptable structures
CIRO-I-333.007	Restore vegetation characteristics of the California Trail period

NATURAL RESOURCES

Aesthetic Resources: 400 - 419

Visual/Scenic Vistas:

CIRO-N-400.000	Establish baseline and monitor the night sky
CIRO-N-401.000	Identify internal and external historic and scenic vistas (viewsheds)
CIRO-I-402.000	Restore and protect scenic qualities of vistas

Audio/Natural Quiet:

CIRO-N-411.000	Establish baseline and monitor natural quiet
CIRO-N-412.000	Monitor aircraft overflights

Atmospheric/Meteorological Resources: 420 - 439

CIRO-N-420.000	Monitor weather on an elevational gradient
CIRO-N-421.000	Monitor air quality for Class II protection
CIRO-N-421.001	Establish baseline air quality
CIRO-N-421.002	Monitor visibility
CIRO-N-421.003	Monitor acid deposition
CIRO-N-421.004	Monitor gaseous pollutants
CIRO-N-422.000	Redesignate airshed to Class I protection

Effects of Air Pollution:

CIRO-N-431.000	Monitor air pollution impacts on aquatic resources
CIRO-N-432.000	Identify species sensitive to air pollutants
CIRO-N-433.000	Establish long-term biological monitoring program

Geologic Resources: 440 - 499

Mapping:

CIRO-N-440.000	Produce a suite of geologic resource maps
CIRO-N-440.001	Field check unpublished bedrock geologic map (incorporate into GIS-database)
CIRO-N-440.002	Map Quaternary geology (incorporate into GIS-database)
CIRO-N-440.003	Map landforms (pinnacles)
CIRO-N-440.004	Inventory fragile rock formations
CIRO-N-440.005	Produce terrain analysis map
CIRO-N-440.006	Train staff on reserve geology and surficial processes

Processes:

CIRO-N-450.000	Study slope stability
CIRO-I-451.000	Control soil erosion and sedimentation
CIRO-N-452.000	Interpret rock exfoliation and other geologic processes

Restoration:

CIRO-N-460.000	Rehabilitate eroded areas
CIRO-I-461.000	Develop a Road Removal and Rehabilitation Plan

Mining:

CIRO-N-480.000	Assess the impacts from mine sites
CIRO-N-481.000	Assess biota inhabiting old mines
CIRO-N-482.000	Improve safety and rehabilitate mine sites

Geothermal Resources:

CIRO-N-490.000	Map external geothermal resources
CIRO-N-491.000	Acquire information on regional geothermal resources
CIRO-N-492.000	Monitor proposals for development

Hydrologic Resources: 500 - 549

Water Resources Management Plan:

CIRO-N-500.000	Develop a Water Resources Management Plan
CIRO-N-500.001	Determine baseline water quality
CIRO-N-500.002	Conduct baseline studies of surface-water flow
CIRO-N-500.003	Conduct baseline studies of ground-water flow
CIRO-N-500.004	Inventory aquatic resources (biotic and abiotic)
CIRO-N-500.005	Survey and map floodplains and wetlands
CIRO-N-500.006	Classify and map streams and springs
CIRO-N-500.007	Inventory water uses
CIRO-N-500.008	Determine the status of water rights

Water Resources Monitoring Program:

CIRO-N-510.000	Establish long-term Water Resources Monitoring Program
CIRO-N-510.001	Monitor and protect surface-water quality and flow
CIRO-N-510.002	Select and survey strategic monitoring sites
CIRO-N-510.003	Monitor storm water run-off at developed areas
CIRO-N-510.004	Monitor the effects of water control structures on downstream flows and erosion
CIRO-N-510.005	Monitor aquatic resources
CIRO-N-510.006	Monitor and protect ground-water quality and quantity
CIRO-N-510.007	Select and survey strategic monitoring sites

Restoration:

CIRO-N-520.000	Restore damaged wetland and riparian areas
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Biologic Resources - Flora: 600 - 649

Native Vegetation:

CIRO-N-600.000	Develop a vascular plant species collection: native
CIRO-N-600.001	Complete a vascular plant species list
CIRO-N-600.002	Purchase herbarium equipment
CIRO-N-600.003	Train reserve staff
CIRO-N-601.000	Update the existing vegetation map
CIRO-N-602.000	Document plant associations
CIRO-N-603.000	Inventory non-vascular plant species list
CIRO-N-604.000	Monitor plant succession after fire treatments
CIRO-N-605.000	Monitor utilization from cattle grazing

Rare, Threatened and Endangered Plants:

CIRO-N-610.000	Conserve rare, threatened and endangered plants
CIRO-N-611.000	Survey sensitive, Rare, T & E plants
CIRO-N-612.000	Monitor plants of special concern
CIRO-N-613.000	Research ecology and habitat requirements of RTE plants
CIRO-N-614.000	Mitigate human-caused threat

Non-native Vegetation:

- CIRO-N-620.000 Survey and map distribution of non-native plant species (see IPM)
CIRO-N-621.000 Develop and implement non-native plant control program

Vegetation Management:

- CIRO-I-630.000 Develop and implement a Vegetation Management Plan

- Developed Zones:* CIRO-N-630.001 Implement a hazard tree management program
 CIRO-N-630.002 Control erosion with native vegetation
- Cultural Zones:* CIRO-I-630.003 Inventory and map culturally significant vegetation
 CIRO-I-630.004 Restore and maintain cultural landscapes
 CIRO-I-630.005 Restore and maintain scenic vistas
- Natural Zones:* CIRO-N-630.006 Inventory and monitor vegetation for impacts
 CIRO-N-630.007 Develop and implement limits of acceptable change
 CIRO-N-630.008 Use native cuttings or nursery stock for site restoration
- Forest Communities:* CIRO-N-640.000 Conduct biological assessment of forest communities

Biologic Resources - Fauna: 650 - 699

Biodiversity:

- CIRO-N-650.000 Determine the level of biodiversity
CIRO-N-650.001 Inventory and list invertebrate species
CIRO-N-650.002 Inventory and list vertebrate species
CIRO-N-650.003 Assess potential for keystone species
CIRO-N-650.004 Map selected wildlife distributions
CIRO-N-650.005 Collect and maintain museum specimens
CIRO-N-651.000 Study riparian faunal communities
CIRO-N-652.000 Survey and map the distribution of non-native fauna

Wildlife Management Plan:

- CIRO-N-660.000 Develop a Wildlife Management Plan
CIRO-N-660.001 Survey and monitor rare, threatened and endangered species
CIRO-N-660.002 Survey and monitor selected carnivores
CIRO-N-660.003 Monitor and manage mule deer populations
CIRO-N-660.004 Monitor and manage upland game-bird populations
CIRO-N-660.005 Manage hunting program in cooperation with state
CIRO-N-660.006 Survey and monitor small mammals
CIRO-N-660.007 Survey and monitor raptor distribution and populations
CIRO-N-660.008 Survey and monitor neotropical migrants
CIRO-N-660.009 Survey and monitor all other bird species on an annual basis
CIRO-N-660.010 Survey and monitor amphibians and reptiles
CIRO-N-660.011 Control poaching and illegal trapping
CIRO-N-660.012 Restore extirpated native wildlife species

Ecosystem Processes/Systems/Linkages: 700 - 749

Wildland Fire:

- CIRO-N-700.000 Develop a Wildland Fire Management Plan
- CIRO-N-700.001 Research and map fire history
- CIRO-N-700.002 Inventory and map fuel loads
- CIRO-N-700.003 Research fire effects as it relates to vegetative response as well as biogeochemical cycles
- CIRO-N-700.004 Manage to restore ecosystem and achieve cultural landscape objectives, for mosaics of seral vegetation and biodiversity

Paleontological Studies:

- CIRO-N-711.000 Conserve woodrat middens until research can be done
- CIRO-N-712.000 Conduct paleontology studies
- CIRO-N-712.001 Study ancient woodrat middens to assess climate change, and vegetative and macroinvertebrate responses during the past 10,000+ years
- CIRO-N-712.002 Extract sediment cores from ephemeral ponds to assess vegetation changes during the past 10,000+ years

Nutrient Cycles:

- CIRO-N-720.000 Research nutrient cycles
- CIRO-N-720.001 Nitrogen pools
- CIRO-N-720.002 NPP pools
- CIRO-N-720.003 Identify the role of invertebrates
- CIRO-N-720.004 Identify the role of non-vascular plants and microbes

Microbiotic Soils:

- CIRO-N-730.000 Inventory microbiotic soils
- CIRO-N-731.000 Study the relationship of microbiotic soil with soil chemistry and hydrology

Integrated Pest Management:

- CIRO-N-740.000 Develop and implement an Integrated Pest Management Plan

ANTHROPOGENIC ELEMENTS: 800 - 899

Visitor Use and Services: 800 - 839

Interpretation:

- CIRO-I-800.000 Integrate resource management issues into interpretation

Rock Climbing:

- CIRO-I-810.000 Develop and implement Rock Climbing Management Plan
- CIRO-I-810.001 Inventory climbing routes
- CIRO-I-810.002 Document current impact due to human activities
- CIRO-I-810.003 Design and implement program to monitor and evaluate climbing-use levels
- CIRO-I-810.004 Develop climbing management policies and guidelines
- CIRO-I-810.005 Manage rock climbing to control impacts

CIRO-I-811.000 Mitigate environmental impacts of climbing
CIRO-I-812.000 Rehabilitate climbing routes

Trail use and Camping:

CIRO-I-820.000 Inventory and map current trails
CIRO-I-821.000 Assess impacts of trails to cultural and natural resources
CIRO-I-822.000 Assess resource condition of campgrounds
CIRO-I-823.000 Develop and implement a Comprehensive Trails System and Management Plan
CIRO-I-824.000 Implement LAC monitoring program
CIRO-I-825.000 Monitor and manage trail use and camping

Hunting and Gathering:

CIRO-N-830.000 Monitor and evaluate hunting within the reserve
CIRO-I-831.000 Monitor level of gathering of edible plants

Private Use: 840 - 849

Grazing:

CIRO-I-840.000 Research and develop a Grazing Management Plan
CIRO-N-841.000 Identify and mitigate impacts related to livestock grazing
CIRO-N-842.000 Study the interaction of wildlife and cattle

Land Protection: 850 - 859

CIRO-N-850.000 Develop a Land Protection Plan
CIRO-N-851.000 Conduct cadastral boundary survey
CIRO-N-852.000 Identify private lands for acquisition

Resource Protection: 860 - 869

CIRO-I-860.000 Incorporate resource protection stipulations in contracts, permits, etc.
CIRO-I-861.000 Develop and implement a reserve-wide recycling program

Special Use Permits: 870 - 879

CIRO-I-870.000 Document and monitor special use permits

External Threats: 880 - 889

CIRO-N-880.000 Monitor use of pesticides on inholdings and adjacent lands
CIRO-N-881.000 Encourage the use of IPM on inholdings and adjacent lands
CIRO-I-882.000 Monitor activities that impact viewsheds
CIRO-I-883.000 Document trespass grazing
CIRO-I-884.000 Develop a hazardous materials management & response plan

INTRODUCTION

PURPOSE

City of Rocks National Reserve's purpose and objectives were developed in the reserve's first Comprehensive Management Plan in 1995 and are highlighted in the sidebar text accompanying this section. The Comprehensive Management Plan sets the overall direction for management of the reserve.

The Resources Management Plan delineates the reserve's strategic plan for the long-range management of its resources and a tactical program identifying short-term projects. It is primarily a plan for the preservation, restoration and management of the reserve's resources. This Resources Management Plan defines and provides management direction for an integrated program of natural and cultural resources management in the reserve. It establishes long-range resource management objectives, prescribes a plan of action to achieve these objectives, and documents progress towards them.

Known natural and cultural resources of the reserve are described in Chapter I. The current condition of these resources and the status of data deficiencies in their inventory, study, and treatment are documented and evaluated in Chapter II. Strategies to solve these problems and deficiencies are suggested in Chapter III. Issues are addressed regardless of the expected time frame for problem resolution.

This plan is also a budgeting tool to obtain funding and staffing for resource management projects, and thus establishes a historical record of management efforts and accomplishments. The intent is that carrying out the actions presented in this plan will lead to a comprehensive, coordinated program of resource stewardship.

Reserve management operations hinge upon the resource management programs this plan prescribes. This plan is also used for developing cooperators and public support. It facilitates transboundary cooperation to reduce the impacts of outside influences on reserve resources and facilitates cooperation with adjoining landowners in the management of ecosystems and cultural contexts.

This plan is the first Resources Management Plan for the reserve and has been developed according to the NPS Resources Management Plan Guideline (1994), under the directives of NPS Management Policies (1988, page 4:2). This plan is intended to be a flexible document, with periodic review (biannual cycle) and revision (4-year cycle). An Annual Project Status and Accomplishments report will be completed by the superintendent for each project or activity which received funding the previous year. At the same time, Programming Sheets 1 and 2 (funded and unfunded activities information), Table 1 (resource personnel), and Table 2 (resource funding) will be updated. Additional project statements will be added as new issues are identified.

CITY OF ROCKS NATIONAL RESERVE COMPREHENSIVE MANAGEMENT PLAN SUMMARY

PURPOSE OF THE RESERVE

There are two primary purposes for City of Rocks National Reserve. The first is to **preserve, protect, and interpret the resources and significant values** that contribute to City of Rocks' uniqueness and attractiveness -- the City of Rocks, a major landmark and principle stopping place along the California Trail; the trail segments and rock inscription associated with the California Trail; the scenery, mystery, and silence of the landscape; the historic sites and current ranching activities that contribute to the historic western rural setting; archeological sites and traditional cultural properties; and the natural ecosystem that supports the species of particular interest and that forms the context of the reserve's cultural values. The second purpose is to **manage recreation** to ensure preservation and protection of these resource values, and in so doing, make the varied resources of City of Rocks available to people for their enjoyment, education, and recreation, now and in the future.

MANAGEMENT OBJECTIVES

The following management objectives identified in the Comprehensive Management Plan are based on direction provided in the reserve's authorizing legislation, landmark designations, the organic act, and *NPS Management Policies*.

Cultural Resource Management

Identify, inventory, evaluate, protect, and preserve the resources related to the California Trail.

- Safeguard the route, remnants, and relics of the trail, including trail archeological evidence.
- Protect the rock inscriptions from further deterioration.
- Preserve the pristine scenic vistas seen by the emigrants along the California Trail.
- Pending historic documentation, stabilize stage station site. (Note: HABS documentation is complete; preliminary archeological testing has been done.)

Identify, protect, and preserve elements contributing to an ambience and scenic quality reminiscent of the American West.

- Ensure the long-term preservation of the traditional kind of ranching that was occurring at City of Rocks at the time the reserve was established.
- Cooperate with the state universities to develop and demonstrate ecologically sound, sustained-yield methods for grazing livestock on public lands.
- Place a high priority on preserving the area's historic rural setting and minimize development.

Identify, inventory, protect, and preserve all historic properties eligible for the national register, including sites, objects, landscapes, districts, and traditional cultural properties associated with the prehistoric and historic human occupation of the reserve and archeological resources.

Aesthetic Resource Management

- Inventory scenic resources; protect and maintain scenic quality.
- Measure, monitor, and protect the reserve's expansive, pristine vistas.
- Protect the romance, mystery, and impressive silence of City of Rocks.

Natural Resource Management

- Strive to preserve and restore natural resources.
- Balance ecological relationships and processes with uses in the reserve.
- Maintain natural conditions as much as possible.
- Determine the location of and protect the important habitat used by rare species and species sensitive to human uses.
- Protect air quality at the highest level possible under the Clean Air Act by working cooperatively with the state of Idaho to redesignate the area from Class II to Class I.
- Conserve natural hydrological processes, including subsurface hydrology and control the acceleration of erosion due to human activities to preserve natural, cultural, and scenic resources.
- Protect or restore wetlands and riparian areas by managing their use wherever possible.
- Complete a comprehensive inventory of natural resources in the reserve.

General Visitor Use

- Give precedence to resource preservation and interpretation over recreational use.
- Provide an integrated visitor experience incorporating, in addition to park resources, historically relevant sites and recreational opportunities in surrounding communities.
- Manage visitor use to ensure that resources are not degraded.

- Prevent vandalism of natural and cultural resources.

Information/Orientation

- Provide adequate information and orientation to allow visitors to plan their visit, tour routes, and use of facilities and services in the reserve and surrounding area.
- Provide the means for visitors to find their way around the reserve.

Interpretation

- Provide opportunities to walk along the California Trail without damaging archeological evidence and to understand and appreciate the life of the emigrants.
- Provide visitors with a sense of history that allows them to place the California Trail in the context of what happened in this region before and after the major period of westward emigration.
- Interpret the historic landscape at the stage station site reflective of the scene in 1869-82.
- Interpret livestock grazing as a traditional use of the region, beginning with the Shoshone.
- Manage the visitor experiences to ensure that each visitor is exposed to the area's essence of romance, mystery, and awe.
- Help people understand the geological history of the area and the processes that created the City of Rocks.
- Provide opportunities for people to learn about the natural vegetation, with an emphasis on pinyon pine, and about the wildlife within the reserve.

Recreation

- Support recreational activities that let visitors experience the reserve's natural, cultural, and scenic resources without impairing significant resource values.
- Manage recreational activities so as to minimize the potential for conflict among different users.
- Provide for an appropriate level of recreational opportunities.

Public Health and Safety

- Ensure that sanitary facilities are adequate.
- Provide emergency services for visitors and staff.
- Provide waste collection points for recreation vehicles outside but near the reserve and adjacent lands.
- Work with local governments to prohibit illegal or inappropriate activities, such as keg parties, illegal drug use, and disturbing the peace.

Cooperative Management

- Fulfill the intents of the area's overlapping designations as a national natural landmark, a part of the California National Historic Trail, and a property listed on the National Register of Historic Places, as well as a national reserve.
- Define those areas or zones within the reserve that would most appropriately be devoted to private use subject to appropriate local ordinances designed to protect the historic rural setting.
- Define the geographical area of local influence on the reserve and work cooperatively with others to eliminate or mitigate actions that would otherwise degrade the reserve's resource values.

(a) Maintain a close working relationship with private land owners to help carry out the purposes of the reserve.

(b) Support county authorities and others in their efforts to protect resources outside the reserve boundaries.

(c) Work cooperatively with other federal and state agencies to accomplish the purposes of the reserve.

- Ensure the continued involvement of local residents in the operation of the reserve.
- Strive to help local communities through local contracts, technical assistance, and other cooperative measures.

Development

- Minimize development.
- Create and implement design standards that reflect the size, scale, and character of the historic western rural setting and that are compatible with the natural surroundings.
- Provide access to the full range of the reserve's significant resources, while protecting sites vulnerable to vandalism or too much visitation. Provide accessibility in accordance with the Americans with Disabilities Act.

Land Acquisition

- Provide for the expeditious public acquisition of lands or interest in lands within the reserve from willing sellers to protect natural, cultural, and scenic resources.
- Give prompt and careful consideration to any property owner within the reserve who notifies the secretary of the interior that continued private ownership within the reserve will result in "hardship."

LEGISLATION, AUTHORITIES and SPECIAL DESIGNATIONS

In 1916 Congress created the National Park Service to manage the nation's park system *"to conserve the scenery and the natural and historic objects and the wild life therein"* and *to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.*" In the same spirit, Congress, in 1988, [P.L. 100-696, The Arizona-Idaho Conservation Act of 1988, Sec. 201(a)] created City of Rocks National Reserve *"in order to preserve and protect the significant historical and cultural resources; to manage recreational use; to protect and maintain scenic quality; and to interpret the nationally significant values of the reserve."*

One of the nationally significant values identified by Congress in the legislative history on the establishment of the reserve is the traditional way people have supported themselves in this region, whether on a short-term basis as an emigrant traveling through the area to another destination, or as a settler homesteading the land. Land-use activities associated with the livelihoods of farming and ranching, such as pasturing of livestock, riding the range, hunting, gathering, cultivation, fencing, developing water supplies and home building, are traditional ways that residents throughout the area have supported themselves. Family outings in the Silent City of Rocks have been a traditional social activity of area residents, and are inseparable from traditional livelihood activities. Tourism was uncommon until the recent emergence of sport climbing.

Resource management deals with human influences on the environment. An environment without human influence does not exist at City of Rocks. In the realm of historical and cultural resources, it is the human influence that is preserved and protected. In the realm of scenic quality, it is the natural setting in which historical events occurred that is preserved and protected. In the realm of natural resources, it is the

ecosystem with its biological, chemical and physical processes that is preserved and protected.

Natural processes unimpaired and alone cannot always heal adverse environmental impacts caused by human activity. Resource management must provide for mitigation of past human activities that continue to have a detrimental effect on natural and cultural resources, as well as for management of human activities occurring now and projected into the future.

Additional Legislation

City of Rocks National Reserve is a unit of the National Park System managed cooperatively by the federal government through the National Park Service, the Idaho Department of Parks and Recreation, and local units of government.

Direction for managing resources comes from the reserve's establishing legislation, the National Park Service Organic Act, amendments to the Organic Act and other guiding acts, National Park Service Management Policies and Guidelines, NPS-77 Natural Resources Management Guideline, NPS-28 Cultural Resource Management Guideline, and the Comprehensive Management Plan for the reserve. The 1978 amendments to the Organic Act state:

The protection, management, and administration of these areas shall be conducted in light of the high public value and integrity of the National Park System and shall not be exercised in derogation of the values and purposes for which these various areas have been established...16 USC 1a-1]

The American Antiquities Act of 1906 establishes the foundation for protection of paleontological resources on federal lands. This act was created to protect any historic or prehistoric ruin or monument, or *any object of antiquity* situated on lands owned or controlled by the Government of the United States from appropriation, excavation, injury or destruction without the permission of the Secretary of the Department of the Government having jurisdiction over the lands where antiquities are situated.

Permission is granted through a permit process to examine ruins, excavate archeological sites, and gather objects of antiquity to institutions which are deemed properly qualified to conduct such examination, excavation, or gathering, subject to prescribed rules and regulations; "provided that the examinations, excavations, and gatherings are undertaken for the benefit of reputable museums, universities, colleges, or other recognized scientific or educational institutions, with a view to increasing the knowledge of such objects, and that the gatherings shall be made for permanent preservation in public museums."

The National Environmental Policy Act of 1969 (NEPA) was created "to declare a national policy which will encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment...."

The Archeological Resources Protection Act of 1979 was enacted to provide protection for historic and archeological resources on Federal lands.

The National Historic Preservation Act of 1966 (as amended) provides the basic framework of federal preservation law and policies. This RMP specifically addresses Section 110 and 112 of the NHPA. Section 110 requires federal land managers (and their designated representatives) to inventory, evaluate, register and protect cultural resources under their jurisdiction that are eligible for the National Register of Historic Places. The entire National Reserve is listed on the National Register by virtue of the 1964 special designation as a National Historic Landmark (see below). Section 112 requires that the studies and actions affecting eligible resources be carried out by professionally qualified individuals. Finally, Section 106 of the NHPA require federal managers and their designated representatives to consult with the appropriate State Historic Preservation Officer and the Advisory Council on Historic Preservation on all proposed actions that have the potential to affect cultural resources eligible for the National Register. The inventory and evaluation requirements of Section 110 support this consultation process by providing the participants with the information needed to assess

the effects of proposed actions. For the City of Rocks National Reserve, the Idaho Department of Parks and Recreation staff managing the Reserve is supported by National Park Service staff from neighboring park units and the Columbia-Cascades Support Office in Seattle in carrying out this responsibility.

Special Designations

City of Rocks was designated by the Secretary of the Interior as a National Historic Landmark in 1964. This designation commemorated City of Rocks as a unique surviving segment of the California Trail, which preserves both the trail's physical remnants, including the ruts created by the thousands of emigrants and their wagons moving through "the City", and an opportunity for visitors to share an experience of the place similar to that of their pioneer forbearers. The Reserve falls within the boundaries of the NHL, excluding some features in the in the NHL north of the Reserve.

City of Rocks was designated by the Secretary of the Interior as a National Natural Landmark in 1974. This designation commemorates City of Rocks for its unique geology that exhibits nationally significant features, including the dominance of bornhardt formations, the scarcity of tors, a wide range of elevations over which the landforms are distributed, and evidence that the landforms have been carved from the upper parts of a pluton.

Public Law 101-512 provides that hunting will be permitted in accordance with applicable laws of the United States and the state of Idaho, except in designated zones where and periods when no hunting may be permitted for reasons of public safety, administration, floral and faunal protection and management, or public use and enjoyment. Except in emergencies, such restrictions will be put into effect only after consultation with the Idaho Fish and Game, which has jurisdiction over hunting activities.

MANAGEMENT ZONES

The system of management zoning for reserve lands designates where various strategies for management and use will best fulfill management objectives and achieve the purpose of the reserve. This prescriptive zoning considers the capability of lands to support identified uses and will be used as a framework for specific planning and management decisions on resource protection and management, visitor use management, and development of the reserve. Reserve management must rely on the voluntary compliance of landowner's of inholdings within the reserve zoning, and on county enforcement of county zoning.

Three primary management zones have been identified in the Comprehensive Management Plan, with the following subzone delineations:

Historic and Natural Preservation Zone

- California Trail Subzone:

Emphasizes preserving and interpreting outstanding features (major landmarks, trail remnants, inscription rocks, encampment area, California Trail corridor). Two management areas were identified:

- *Foreground of California Trail*
- *General Use*

- Natural Area Subzone:

Emphasizes preserving exceptional natural resource values and providing recreational opportunities where appropriate. Three management areas were identified:

- *Research Natural Area*
- *General Natural Area*
- *Natural and Recreational Resource Area*

Historic Rural Setting Zone

The intent would be to preserve the historic rural setting and to perpetuate ongoing ranching activities that captured the rural character of the Reserve at the time of its establishment.

- Private Land
- Public Land

Public Use and Development Zone

Only those modest facilities essential to visitor enjoyment of resources, such as access roads, parking pull-offs, trails, picnic sites, primitive campsites and toilet facilities would be included in the reserve.

Summary

Subzones allow reserve management to indicate in greater detail how the terrestrial, aquatic and cultural resources will be managed. Subzones distinguish the particular resource values and use potentials of various areas within the reserve, and provide for measurable and specific management objectives. Management prescriptions are tailored to achieve the resource management objectives for each delineated area.

What is described in the following sections of the RMP is an organized approach to achieving a comprehensive and fully funded reserve-wide resources management program: planning and compliance; information gathering and evaluation; resource protection, maintenance, restoration and rehabilitation; managing the distribution and intensity of visitor experiences; and educating our visitors about our cultural heritage, fragile environments and the dynamics of City of Rocks natural processes.

PLANNING PROCESS

This RMP was initiated with a scoping session held in June 1994. Using the Comprehensive Management Plan as a foundation, resource issues and management objectives were identified through an interdisciplinary work group effort of cultural and natural resource subject-matter specialists. Team members included specialists from the Columbia-Cascades Support Office, reserve staff (both NPS and IDP&R), and the Idaho State Historic Preservation Officer. Assignments were made for the development of management prescriptions.

RESOURCE MANAGEMENT GOALS and OBJECTIVES

Resource management issues were identified by the interdisciplinary resources management team. These issues are the focus for development of resource management objectives, which are used to guide the development of program strategies and project statements outlined in subsequent sections of the RMP. Accomplishment of these projects in a programmatic order is intended to achieve effective resource stewardship.

Some resource management goals are specific to management zones defined in the Comprehensive Management Plan, while others transcend all zones. Each of the identified goals is followed by recommended objectives.

Cultural/historic zone: manage and protect the cultural resources, including the cultural landscape of the reserve to show how people have lived with the land over a continuum of time from prehistoric time to 1988.

- Develop understanding of the cultural resources of the reserve.
- Develop understanding of the resources that make up the cultural landscape.
- Develop a plan to manage the cultural resources effectively.
- Develop and implement design standards.
- Inventory, evaluate and protect archeological resources.
- Conduct a Historic Resource Study.
- Conduct a Cultural Landscape Inventory.
- Conduct an ethnographic overview and assessment.
- Document collections and prepare a Scope of Collections statement. Partnership with other collection facilities until there is on-site capability.
- Evaluate and possibly revise or amend the nomination for National Register of the National Historic Landmark.
- Prepare a Cultural Landscape Report. Prepare a Vegetation Management Plan that provides direction for restoring and protecting cultural landscapes. Develop and implement an ecologically sound Grazing Management Plan that restores the vegetative character and productivity of cultural landscapes, and provides for long-term sustainability. Retain traditional rural architecture and style of structures. Identify and exchange resource-impacting traditional land-use practices and technologies for those which are ecologically sustainable.

Conserve natural ecosystems and ecosystem processes in the natural zone.

- Develop and understanding of ecological processes across boundaries especially those most likely to be affected by human activities and facilities.
- Systematically survey the natural resources of the reserve (air, weather, geology, hydrology, vegetation, fauna, ecosystem processes and interrelationships).
- Identify, document, monitor, and mitigate internal and external threats to natural resources and processes.
- Develop partnerships with neighboring landowners and other agencies to share information and cooperation in resource stewardship and management.
- Develop partnerships for resource studies with universities and other organizations to monitor activities with potential to impact natural resources and processes.
- Develop and maintain natural and cultural resource expertise on reserve staff and among cooperators.
- Interpret natural resources to develop public understanding and support for resource conservation.
- Manage natural and cultural resource information in consistence with available and usable standards (GIS, maps, photos, surveys). Peer review and publish results of studies.
- Document and manage museum collections and archives. Partnership with other collection facilities until there is on-site capability.
- Manage the Research Natural Area as a site for non-manipulative research consistent with NPS-77. Include use as a reference site for research conducted elsewhere.

- Restore areas impacted by past activities (mining, erosion).
- Restore extirpated species. Prepare a Wildlife Management Plan that addresses hunting, year-round shooting, poaching and illegal trapping, monitoring of non-game species, and monitoring of the effects of management.

Conserve the geological features which were the basis for designation as a National Natural Landmark.

- Map the geology and landforms of the NNL/ reserve.
- Inventory fragile rock formations.
- Document current impacts to natural resources due to human activities.
- Implement a monitoring program of human activities and impacts to resources.
- Manage human uses, as needed, to conserve resources.
- Interpret exfoliation and other geological and tectonic processes that these features demonstrate.

California Trail zone: conserve and protect cultural resources, including the landscape associated with the California Trail, which were the basis for designation as a National Historic Landmark.

- Define the critical cultural resource elements in the California Trail corridor, such as wagon ruts, trail attributes, views and viewsheds, historic "scene", and Native American sites.
- Identify important related features and elements outside the ½-mile corridor.
- Conduct resource inventories.
- Develop and implement a management plan with follow-up inventory. Partnership with Oregon-

California Trail Association.

- Develop design guidelines for acceptable structures.
- Restore vegetation characteristic of the California Trail period.

Protect and maintain scenic vistas and qualities.

- Define scenic qualities.
- Identify internal and external scenic vistas to complement the GIS-derived internal viewshed analysis in the Comprehensive Management Plan.
- Monitor air quality and night sky. Restore and protect scenic qualities of viewsheds. Monitor aircraft overflights. Establish baseline and monitor ambient levels of silence at selected locations in the reserve.
- Manage vegetation.

Interpret the natural, cultural, and scenic resources in a way that does not impact them and in a way that encourages public understanding and appreciation of their significance.

- Develop guidelines for appropriate interpretive media and structures, such as trails, wayside exhibits and brochures, associated with cultural resources.
- Identify critical resource issues such as geology, natural vegetation and wildlife, and livestock grazing, where interpretation can contribute to resource stewardship; address themes, their contexts and interrelationships.

- Identify opportunities for the public to be introduced to resource values.
- Identify natural and cultural resources that are particularly resilient or sensitive to use.
- Ensure that new findings from resource studies/research are available to interpreters.
- Develop cooperative partnerships with adjacent landowners and agencies.

Provide for and manage recreation to ensure preservation and protection of natural and cultural resource values.

- Conduct resource studies to provide information for upcoming planning processes and feedback for current management programs. Include visibility from scenic viewpoints.
- Implement monitoring of recreational activities regarding Limits of Acceptable Change.
- Perform compliance on new activities, development or management being considered.
- Conduct sociological studies regarding conflicting uses.
- Manage year-round shooting to hunting seasons and provide for visitor safety.

The natural and cultural Resources Management Plan, as well as information resulting from resource studies and other sources, will be integrated with the Comprehensive Management Plan, Statement for Management, Outline Planning Requirements, and other park management/ development plans, such as the Interpretive Prospectus.

DESCRIPTION of the REGION

City of Rocks, an extraordinary encirclement of granite rising out of the gently rolling sagebrush country in south-central Idaho, has attracted and intrigued people since they first entered this region. The Shoshone camped here, as did the emigrants traveling along the California Trail, and they and the settlers who followed have overlaid a rich human history onto this dramatic natural backdrop. For all the area's significant natural and cultural values, it did not receive national attention at a time when many of the other natural and cultural wonders of the West were withdrawn as federal reserves. Instead, the area was homesteaded, and most of the land in the heart of the City of Rocks passed into private ownership. Generations of Cassia County residents have made their living here and found recreation and inspiration in the area's natural and historic resources. Local residents are strongly tied to City of Rocks, and traditions run deep. Increasingly, people from outside the region, most notably sightseers, but also rock climbers and other recreationalists, are discovering the area. Concerns about growing use of the area prompted local residents to support efforts to designate City of Rocks as a national reserve, a national historic landmark, and a national natural landmark, and the area was added to the national park system in 1988.

The reserve is in Cassia County, one of eight counties in the south-central Idaho region known as the Magic Valley. Cassia County represents 14.6 percent of the region's total population and ranks third in the state for total farm income. This income includes crops from developed croplands and products from agricultural processing centered in Burley. The county's population grew by more than 14 percent from 1970 to 1980 and decreased by 18 percent from 1980 to 1990.

Most of the small towns surrounding the reserve were established by Mormon settlers during the late 1800s, and Mormons continue to represent the predominate population of the area.

Agriculture and related industry establish the major economic base of Cassia County. Major employers include Simplot Foods, The South Idaho Press, Boise Cascade, and Del Monte. Burley, the county seat, serves as the wholesale and retail trade center for the eastern portion of the Magic Valley.

The county's land use and ownership patterns generally reflect those of the region. Rangeland covers 68 percent of the county, and 28 percent of the land is used for agricultures. Fifty-seven percent of the county's land is managed by the federal government and 40 percent is privately owned. Unincorporated lands of Cassia County are zoned by the county as a "multipurpose zone." Zoning of incorporated land is the responsibility of the incorporated units.

Almo is the closest town to the reserve and lies 2 miles away to the east. The current population in the vicinity of this unincorporated town is about 175-250, according to local officials. It is not identified in the census data because it is unincorporated. Although statistics show the population as 15 inside the town's limits, locals living 3 to 10 miles out consider themselves part of Almo. The post office has approximately 50 boxes, and there are two rural mail routes.

The layout of the consolidated part of Almo is typical of Mormon colonies (Arrington 1979). Elements include a wide north-south main street, the ward church one block off the main intersection, a school and store at the main junction, houses and barns clustered around the main intersection, and fields radiating away from the town center. This pattern evolved from the European farm village and was successfully developed by homogenous religious and immigrant groups in the Midwest and Utah/Idaho, including the Amana colonies in Iowa. Inherent in this layout was a communication and social network.

Structures in town originally were made with logs harvested from the hills behind Albion, another Mormon settlement about 30 miles to the north, and milled there. Limited use of locally quarried granite replaced log construction by 1900. The advent of a brick operation in Almo supplied materials to Albion

and Declo and allowed for fine masonry early in the life of surprisingly remote locations. The Tracy store in Almo, the hotel in Declo, and the normal school in Albion are excellent examples of the craftsmanship achieved using the russet native sandstone brick.

The Tracy store/post office serves as the primary commercial center of the community. The elementary school, diagonally across from the store, is also a sandstone brick building that doubles as the community meeting hall. The ward church is the predominant social center with church-sponsored sporting and other events. The reserve's administration log building, previously a residence, is the only other nonresidential use in town.

The quality of life in Almo is quiet, peaceful, family-centered, and community-oriented according to interviews with residents. Local crime is nearly nonexistent. Citizens claim they can walk out their door and hear the sounds of the neighbors' chickens 1/4 mile away. They also describe themselves as quiet, private folks who are comfortable and content with their lives. As in many rural locations, youthful restlessness causes departures. Within the last eight years, some of the former residents have returned to the Almo area to raise their families, which may account for the increase in enrollment at the elementary school.

Land uses adjacent to town include dryland farming and a cemetery. Visual details include hayfields adjacent to the edge of town; houses, barns, and yard gates along the gravel county road; bridges constructed of peeled logs; and fences with crafted wooden gates. Horses occasionally graze unrestrained within the road right-of-way and cattle graze in nearby pastures. Occasional cattle drives between pastures is typical along the road right-of-way.

On the west side of the reserve, corrals and loading chutes, along with dilapidated buildings from a small ghost town, suggest a more rugged pioneer existence. Gray, weathered log and wood-shingled structures in Moulton seem timeless. Unmilled logs and milled limber are used for livestock containments in this area. Remnants of a historic line camp indicate a more recent tie to ranching and cattle raising operations on this side of the reserve. These sagebrush covered lands are privately owned and used for grazing. No current structures are visible from roads exiting the reserve.

The town of Oakley, 17 miles northwest of the reserve, on the western side of the Albion mountains, is the predominant commercial and residential center in southern Cassia County. The town was settled by colonizing Mormons at the same time as the eastern side. Historically, it served as the religious center of the county, with the larger stake house located here, until Burley became the county seat. The town has a developed downtown district of commercial and residential uses that has been designated a national historic district. Quarrying of mica-bearing ferrous-colored Oakley stone (quartzite) has created the major industry in town. This stone, suitable for veneer and paving applications, can be seen throughout the region as well as on buildings in town. The recent renovation of the historic opera house included Oakley stone paving on the lobby floor.

Statistically, the town is about six times larger than Almo, has a slightly higher rental vacancy rate, and a population that is thinner in the ranks through the young adult to middle-age group than either the county average or the eastern side of the mountains. The town is surrounded by irrigated potato and sugar beet fields.

DESCRIPTION of the RESERVE

CLIMATE

City of Rocks National Reserve has a semiarid climate characterized by low to moderate precipitation, great extremes in both daily and seasonal temperatures, and low relative humidity. The dry, hot summers and cold winters are characteristic of basin and range country in the northern Intermountain West. Due to prevailing westerly winds, rain and snow are mostly from Pacific air masses. The rain shadow effect of the Sierra Nevada Range allows only the strongest storms to contribute much precipitation. Average annual precipitation is approximately 14 inches at the lower elevations of the reserve (5650 feet) and may exceed 22 inches in the highest areas near Graham Peak (8867 feet). Most precipitation occurs from March through June with occasional thunderstorms during the hot, dry summers. Average snow depths for higher elevations during March and April range between 35 and 68 inches.

The closest weather station is in Oakley, located 12 miles northwest of the reserve at an elevation of 4600 feet. Conditions in the reserve are probably slightly different than Oakley. Weather records for Oakley are shown in the table below.

Temperature Data, Oakley, ID

Measurement	Degrees Fahrenheit
mean annual temperature	48
extreme recorded high	105
extreme recorded low	-27
average winter temperature	31
average winter daily minimum	21
average daily summer temperature	67
average daily summer maximum	83

AIR QUALITY

Air quality in the west-central United States, including southern Idaho, generally has the best visual quality anywhere in the country (Sisler et al. 1993). City of Rocks has been designated a Class II area for purposes of controlling increases in air pollution under the Clean Air Act.

High particulate-matter concentrations occur in the reserve when strong winds lift dust from exposed soils in agricultural fields or on dirt roads. Smog can sometimes be seen when prevailing winds carry pollution from nearby population centers.

SCENIC QUALITY

While it is true that many visitors patronize the reserve for its world-class rock climbing, the scenery is the reserve's predominant attraction. A 1992 visitor survey conducted by the University of Idaho determined that 70% of visitors come primarily for the scenery, and 47% spend time photographing it. The survey also indicates that 30% specifically commented on their enjoyment of the scenery. This quality is due to the unique arrangement and shapes of the granite outcrops, and their positioning in a basin surrounded on all sides by mountains--of which 10,399-foot Cache Peak dominates. The quality is also due in part to the area's contrast to the agricultural valleys and urban landscapes along the Snake River Plain. Further, the colors of the reserve are striking. Rocks and vegetation can range from white to red and yellow to deep green. The juxtaposition of these colors against a typically brilliant blue sky further define this subjective quality called scenic.

NATURAL QUIET

Early maps and tourist brochures identified this City of Rocks as the *Silent* City of Rocks, distinguishing it from the Gooding City of Rocks, another unique geological area approximately 100 miles northwest of the reserve. Natural quiet was a recognized value of the reserve over 50 years ago. Most days only the "quaking" of the aspen, and an occasional bird can be heard. This unusual silence is due in part to its remote location, but also to the sound-absorbing effect of the

granite monoliths.

PHYSIOGRAPHY

City of Rocks stands near the northern margin of the coterminous Basin and Range physiographic province. The reserve is in the southern part of the Albion Mountains. Major ranges and valleys in the region tend to be oriented north-south. The Snake River Plain lies 15 miles northward. West of City of Rocks are two streams: Birch Creek, which drains northward to Oakley and the Snake River Plain; and Junction Creek, which drains southward and joins the Raft River. The headwaters for Birch and Junction Creeks are just west of City of Rocks at Lyman Pass. East of City of Rocks, in the upper Raft River Valley, is the northeasterly flowing Raft River, which originates in northwestern Utah and converges with the Snake River. Much of City of Rocks is drained by easterly flowing intermittent streams which flow into the Raft River. The Raft River and Grouse Creek ranges join the southern end of the Albion Range south of the reserve, just across the Utah border. The Raft River Range is one of the few Intermountain ranges that is oriented east-west.

GEOLOGY

Tectonic Setting

The Albion-Raft River-Grouse Creek mountains are one of approximately two dozen Cenozoic metamorphic core complexes of the North American Cordillera. These complexes occur in a sinuous belt that lies west of the Cordilleran fold and thrust belt from Canada to California, and then continues southeast-ward through the basin and range country of Arizona, where it lies athwart the northeast edge of the fold and thrust belt, before continuing south into Mexico. Briefly, a metamorphic core complex is an exposure of rocks that were once part of a ductile lower crust, on which shallow brittle extensional features have been superimposed. Essentially, they are unique geologic terranes where highly deformed rocks originating at depths of 10 to 20 km have been brought to the surface by means of crustal extension and/or tectonic denudation. Several of these terranes show multiple stages of deformation, and all have associated igneous intrusions where the parent

magma usually originated from melting or assimilation of crustal rock, rather than direct derivation from a subduction zone.

Metamorphic core complexes have only been identified since the late 1960s and new terranes continue to be recognized elsewhere in the world. Some of these terranes were identified by earlier geologists as mantled gneiss domes: geologic structures consisting of complicated metamorphic terranes covered by sedimentary rocks which have been subsequently metamorphosed, all of which have been intruded by plutons. The domal structures are not readily observable, but are identified by interpreting geologic maps of metamorphic terranes, analysis of microscopic strain in rock, and differentiating subtle changes in mineralogy.

Metamorphic core complexes are geologically controversial because of the difficulty in trying to unravel their complex deformational histories and integrate them into tectonic models for Cordilleran structural evolution. Based on K-Ar and Rb-Sr studies, the metamorphic basement rock of the Albion-Raft River-Grouse Creek core complex is among the oldest exposed crustal rock in western North America. More important than the age of any one rock formation is the rare exposure of metamorphosed rocks that have preserved a history of deformation of the crust at deep levels. The metamorphic petrology, complex structures and age relationship of each formation within the terrane continues to attract researchers who study cordilleran tectonic evolution.

Petrology

The landscape of City of Rocks has been sculpted from the upper parts of the Almo pluton, one of four intruded segments of the Cassia batholith in the Albion Range. The pluton is composed of two granitic-type rocks, quartz monzonite and granodiorite, which commonly occur together elsewhere in the world and are collectively referred to as adamellite. Quartz makes up 10% to 50% of the felsic minerals, and the plagioclase/ total feldspar ratio ranges from .35 to .60. This rock undergoes granular disintegration by chemical weathering around crystal boundaries, resulting in angular,

coarse-grained fragments, or grus, accumulating on the ground.

Based upon K-Ar and Rb-Sr analysis, Armstrong (1967) concluded that the Almo pluton intruded the older metamorphic rock of the Green Creek complex about 25 to 30 million years ago. The Green Creek complex is the basement rock of the Albion Range and is predominantly granitic gneiss, with localized areas of schist and amphibolite. The contact between the pluton and gneiss is observable on the south side of the ridge separating City of Rocks from Castle Rocks, on the west side of Smokey Mountain, and along the west side of the row of pinnacles trending northward from Pinnacle Pass and crossing through the saddle between the Twin Sisters. The Green Creek complex is absent from the western part of the reserve where the Almo pluton has intruded through it and into the Elba Quartzite. Armstrong also dated the Green Creek complex at about 2.5 billion years, which would make this one of the oldest known rocks in the western United States.

The Green Creek complex is unconformably overlain by the Elba Quartzite, a Precambrian to Cambrian micaceous metamorphosed sandstone and mudstone. The quartzite is more resistant to chemical weathering than the adamellite and forms the capping layer on most of the ridges surrounding the City of Rocks. By tracing out the quartzite ridges it is possible to envisage the domal structure of the southern end of the range. Quartzite hogbacks are prominent outside the reserve on the east side of Smokey Mountain and in the town of Almo. This stone is quarried from adjacent mountains to the west and south for use as a veneer building stone, known as Oakley Stone.

Volcanic deposits of quartz latite and rhyolite cap part of the ridge along the western boundary south of Emery Canyon. Other volcanic deposits in the region can be found in Birch Creek, in the Jim Sage Mountains east of Almo, in the mountains southwest of Oakley, and in the Snake River plain.

Geomorphology

The most notable landscape feature of the reserve is the abundance of prominent, steep-sided, smooth and

rounded bedrock knobs, known as bornhardts. Bornhardts are small-scale, granite-gneiss domes that form by granular disintegration along joints. Exfoliation processes may also occur due to the occurrence of large rock debris at the base of some of the knobs. Most bornhardts have formed in the Almo pluton, but some also occur in the gneiss of the Green Creek complex. Several bornhardts and exposed bedrock form a crescent-shaped wall along the northern side of Circle Creek basin where they achieve their highest elevation. An alignment of rock towers continues around the western perimeter of the basin, as well as a ridge of towers extending northwest of Pinnacle Pass. Smaller and more isolated knobs protrude from the floor of Circle Creek basin. Within Circle Creek basin there is a westerly progression of larger and higher pinnacles.

As the Almo pluton cooled and crystallized, the rock contracted and two sets of vertical joints developed. The north-south contraction joints dominate over the east-west contraction joints, thus many of the eroded landforms are elongate, with their long axes trending north-south. These elongated knobs are also described as whalebacks, resembling a group of whales rising to the surface of the ocean.

After the pluton cooled and erosion began to remove the overlying rock, dome-shaped and horizontal joints began to form as a result of pressure release. These joints tend to be parallel to the land surface and thus have developed broad curvature. Erosion along horizontal joints resulted in the formation of rectangular-shaped knobs called tors. Cunningham (1971) identified only a few of these in the reserve. Erosion along dome-shaped joints contributes to the formation of domical towers. When looking at the bornhardts on end (from either the north or south) the overlapping domical joints within any one pinnacle appear as an upside-down stack of saucers leaning to the east. Pressure unloading was probably not uniformly vertical, but favored an eastward component. This may explain why many of the bornhardts are asymmetrical with their western slopes steeper than their eastern slopes, as well as the westerly progression of larger and higher pinnacles within Circle Creek basin.

The pinnacles are as high as 500 feet, and range across more than 1000 feet in elevation. The small pinnacles in the floor of Circle Creek basin are more than 1,000 feet below the summits of the highest ones. The reserve rises from about 5650 feet in low, shrubby basins where Circle Creek meets the eastern reserve boundary, to 8867 feet at the summit of Graham Peak in the north. Total relief is 3217 feet.

At a smaller scale the surfaces of many rocks were further shaped by weathering and case-hardening. Chemical weathering around crystal-grain boundaries weakens the rock and makes it friable. Wind and rain can then remove these grains, forming panhole depressions in the rock. There are several hundred panholes in the reserve; the most notable one is located on top of Bath Rock and frequently fills with water from rain or snowmelt. Evaporation in the arid climate withdraws intergranular moisture and redeposits the dissolved elements, primarily iron, on the outer surface, forming a chemically cemented crust - case hardening. Neither process is uniform, as evidenced by closely spaced areas of case hardened and friable surfaces.

Alpine glaciation occurred in the higher parts of the Albion Range north of the reserve. Cache Peak and Independence Peak were partially shaped into horns. Horns are steep-walled, pyramidal, peaks carved by glaciers. Both peaks are separated by a sharp, steep ridge known as an arete. The Independence Lakes fill a cirque on the northeast side of the arete. Although no evidence has been found to support glaciation in the City of Rocks, periglacial processes during glacial times probably influenced weathering and erosion of the terrain.

Paleontology

There are no known fossil localities in the reserve, although weathered-out pelecypods have been found lying on the ground. Their host rock is unknown.

SOILS

The majority of mountainside soils (slopes greater than 20 percent) are shallow (less than 20 inches to bedrock) and composed of very gravelly or cobbly loam or coarse sandy loam with large rock fragments

exposed at the surface. The basin soils (less than 20 percent slopes) are moderately to very deep (greater than 60 inches to bedrock) and composed of loam or sandy or gravelly loam.

Microbiotic soils occur along the ridgeline overlooking Indian Grove.

WATER RESOURCES

Surface water

Surface water is limited to a few small headwater streams and springs. Graham Creek, Circle Creek, and intermittent streams in Heath Canyon and Emigrant Canyon flow east toward the Raft River. Trail Creek drains west to Junction Creek, which courses around the southern end of the reserve to the Raft River. The headwaters of Emery Canyon flows from the northwest portion of the reserve west to Birch Creek, which eventually flows to Goose Creek. Both Raft River and Goose Creek flow into the Snake River.

Stream gradients in the southern Albion Range are steep, averaging 370 feet per mile on Almo Creek, 520 feet per mile on Graham Creek, and 360 feet per mile on Circle Creek.

Geothermal resources

While there are no known geothermal resources within the reserve, there are warm springs located in and around the town of Almo, and hydrothermal wells, some of which are artesian, in the Raft River valley basin. The hydrothermal ground water is attributed to a local geothermal gradient that is twice the global average.

In 1955, the Atomic Energy Commission (later the Department of Energy) initiated the Raft River Geothermal Project, an experiment to test materials and technology utilizing geothermal water for producing electricity. A pilot plant was constructed off of the south end of the Jim Sage Mountains, about 15 miles east of what is now City of Rock National Reserve, where ground water in contact with hot rocks was collected through a series of deep wells.

During the height of the experiment 5 megawatts of electricity was generated, but two-thirds of this was required to operate the system. The pilot plant operated for only two weeks at this peak capacity. This power demand for operation, plus the cost for chemical treatment and disposal of spent ground water, proved to be uneconomical. The project was closed down in 1982 and the pilot plant disassembled and moved to El Centro, California, where other geothermal energy experiments were occurring. A small power plant remains in operation, supplying electricity to the town of Malta, east of the Jim Sage Mountains.

Idaho Congressman Frank Church promoted this project during the 1970's oil embargo. But the project slowed down after the embargo was eased.

Idaho state law has three temperature ranges for regulating ground water: 85° F for cold water; 85°-212° F for low temperature geothermal water; and greater than 212° F for high temperature geothermal water. Geothermal waters are more mineral rich than cold water, and reflect the mineralogy of the heated rock with which it was in contact. Such water has diminished value for domestic and agricultural use, consequently placing greater social and economic value on sources of cold water. Ranchers drilling irrigation wells in the Raft River valley have often had to drill deep (e.g. 500 feet) to find water and risk encountering geothermal water. For example, an irrigation well drilled in 1992 approximately one mile south of the AEC (DOE) well field, hit 125° F water at 600 feet (Lloyd, pers. comm.). During the mid-1970s a Department of Energy drilling crew drilled four production and three injection wells between 4000 and 6500 feet and encountered ground-water temperatures of 290° F.

Because of the occurrence of geothermal ground water in the Raft River Valley the State Department of Water Resources has identified a critical groundwater area starting at the Port of Entry and extending south to the Utah border. Permits for the development of new wells within this critical area are closely scrutinized by the Department of Water

Resources.

VEGETATION

A total relief of 3,000 feet and a variety of exposures and rock/soil types produce many different types of vegetation communities in City of Rocks. Today most of the plant cover, except vegetation on steep, rocky exposures, is considerably changed from its natural condition. The changes over time were caused by a combination of man-induced factors, including intense grazing, dryland farming, fire suppression, brush control, seeding, development of roads and trails, and camping.

The dominant plant communities in the study area include 1) pinyon/juniper woodlands and forest, 2) conifer/aspen woodlands and forest, 3) riparian scrub and herbaceous wetlands, 4) big sagebrush and grasslands, 5) mixed scrub, 6) mountain mahogany scrub, 7) high elevation meadows, and 8) other unvegetated areas.

Big Sagebrush/Grasslands

The arid open valley floors of the Circle Creek basin and upper Emigrant Canyon were originally covered with a mosaic of vegetation dominated by open stands of big sagebrush with an under-story of native perennial grasses such as Idaho fescue. Today, most of the City of Rocks basin is covered by monotypic stands of big sagebrush interspersed with plants with little or no forage value, such as tansy mustard, rabbit brush, and exotic Russian thistle, peppergrass, cheatgrass, and halogeton. Crested wheatgrass (another exotic) dominates the understory where private landowners and the Bureau of Land Management have improved range for livestock. Areas with sagebrush steppe vegetation in a natural condition are scarce in southern Idaho.

Pinyon/Juniper Woodland and Forest

The pinyon/juniper woodlands occur adjacent to the sagebrush areas in the rockier and rougher terrain of the reserve. These woodlands are dominated by single-leaf pinyon pine and Utah juniper interspersed with mountain big sagebrush, curleaf mountain-

mahogany, Rocky Mountain juniper, chokecherry, bluebunch wheatgrass, and Great Basin wild rye. The reserve contains the northernmost range of the single-leaf pinyon pine. The pinyon pine seed is edible and is gathered by local residents. The trees of this cover type may grow to 30 feet in height but are generally less than 15 feet tall. They are bushy and almost as wide as tall. When destroyed by fire, this type gives way temporarily to grass or shrubs.

Mixed Scrub

The higher slopes are covered with mountain big sagebrush, mountain snowberry, serviceberry, and bitterbrush, with other shrubs, grasses, and herbs growing in the openings between the shrubs.

Conifer/Aspen Woodland and Forest

The mountain woodlands are characterized by groves of aspen, stands of Douglas-fir and lodgepole pine, or open meadows located on the upper stony/grassy slopes of the reserve. Quaking aspen communities occur in canyons containing perennial or intermittent streams. Narrowleaf poplar, thinleaf alder, serviceberry, chokecherry, and snowberry occur in the understory of the aspen groves. Rocky Mountain juniper occurs more frequently in the aspen understory than elsewhere in the area.

Riparian Scrub and Herbaceous Wetlands

Riparian vegetation is limited to a small portion of the reserve adjacent to stream courses and springs. Riparian zones are associated with water and occur as important transition zones between aquatic and terrestrial communities. These transition zones have a greater quantity and diversity of plant species than adjoining land. They provide food, water, and cover for both wildlife and livestock. Overgrazing has altered much of the riparian areas in the reserve, causing accelerated soil erosion and elimination of typical riparian plant species. Typical riparian plants found in the reserve include aspen, willow, Rocky Mountain maple, box-elder, thinleaf alder, chokecherry, rushes, sedges, and bluegrasses. Much of the riparian vegetation in the reserve is located in wetland areas mapped by the U.S. Fish and Wildlife Service.

Mountain Mahogany

On some higher mountain slopes of the reserve, stands of nearly pure curleaf mountain mahogany are present. They occur next to or are surrounded by pinyon/juniper on sites that are less rocky and steep. Other species found growing with the mountain mahogany includes limber pine, mountain snowberry, Idaho fescue, and bluebunch wheatgrass.

High Elevation Meadows

Mountain meadows near the upper ridges contain a combination of grasses, herbs, sedges, and wildflowers. Various species introduced through human activities, including wheatgrass, cheatgrass, halogeton, and others, are also present.

Other Unvegetated Areas - Bare ground/Rock

This category includes the many exposed rock formations with colonies of various lichens and bare ground disturbance such as mining spoils.

WILDLIFE

The diverse habitat of the reserve supports a large variety of mammals, birds, reptiles, and invertebrates. Streams in the reserve provide only marginal fish habitat and likely do not support any fish.

Mammals

A partial list of mammals in the reserve includes mountain lions, mule deer, coyote, bobcat, badger, porcupine, red fox, cliff chipmunk, mountain cottontail and pygmy rabbits, blacktail jackrabbit, northern grasshopper mouse, merriam shrew, several species of voles, and a variety of bats. Pronghorn antelope and bison were probably common a century ago. Bighorn sheep were common throughout the area until the early 1900s. Hunting by settlers, range exploitation by domestic livestock, and disease transmitted by livestock led to the population decline.

Endangered/Threatened Species

According to the U.S. Fish and Wildlife Service, there are no listed or proposed threatened or endangered species in the City of Rocks area. Two candidate species of hawk have been identified,

however: the Ferruginous and Swainson's (Buteo regalis and Buteo swainsonii, respectively). There are species recognized by BLM and IDFG as "sensitive" and "species of special concern"; these include the bobcat and kit fox.

Birds

Approximately 156 species of birds are known to occur within or adjacent to the reserve boundary. Common, year-round residents include: American Kestrel, Northern Flicker, Black-billed Magpie, Common Raven, Mountain Chickadee, Dark-eyed Junco, and Cassin's Finch. More uncommon occurrences include: Golden Eagle, Prairie Falcon, Common Poorwill, Gray Flycatcher, Pinyon Jay, Say's Phoebe, and Virginia's Warbler. Other species such as Sage Sparrow, Black-throated Gray Warbler, and Plains Titmouse are expected to occur in the area, but are unconfirmed.

Indicative breeding birds are listed beside the reserve's typical habitat:

Sagebrush: Sage Thrasher, Green-tailed Towhee, Brewer's Sparrow, and Vesper Sparrow.

Mahogany-Pinyon-Juniper: Chipping Sparrow, Western Scrub Jay, Robin, and Cassin's Finch.

Aspen-Chokecherry: Red-naped Sapsucker, Mountain Bluebird, and Mountain Chickadee.

Lodge-pole-Spruce: Clark's Nutcracker, Red-breasted Nuthatch, and Yellow-rumped Warbler.

Willow-Riparian: House Wren, Yellow Warbler, Lazuli Bunting, and Red-winged Blackbird.

Rock Cliffs/Ledges: White-throated Swift, Violet-green and Cliff Swallows, and Red-tailed Hawk

Peregrine Falcon probably occurred naturally within City of Rocks, but since their decline throughout North America, they have not been confirmed within the reserve. Wild Turkey, Ring-necked Pheasant, and Gray Partridge were originally released in the western

U.S. as a game bird, and now perpetuate their populations within the reserve. Due to adjacent agricultural land, non-native species such as European Starling, House Sparrow, and Rock Dove are quite numerous in the area; however, only the Rock Dove occupies habitat to any great extent inside the park boundary.

Amphibians and Reptiles

Of the four salamander species in Idaho, none occur in the Albion Mountains. Four species of amphibians are thought to occur in City of Rocks, but have not been verified in the field. These include: *Bufo borealis* (Western Toad, which occurs statewide), *Pseudocris regilla* (Pacific Tree Frog, which occurs as far east as the Albion Mountains), *Scaphiopus intermontanus* (Great Basin Spadefoot, which occurs as far north as the Snake River Plain), and *Rana pipiens* (Northern Leopard Frog, which occurs as far north as the Snake River Plain, and west to the South Hills).

Fourteen species of reptiles are thought to occur at City of Rocks, but only four are verified in the field. These include: Sagebrush Lizard, Great Basin Gopher Snake, Rubber Boa and Great Basin Rattlesnake. For a list of reptiles believed to occur within the reserve, see Appendix D. Generally, only a few snake sightings are reported each year, and there have been no human-snake encounters of note. Probably the most often observed herptile in the Reserve is the Sagebrush Lizard.

Insects

No survey of insects has been conducted within the reserve. There are no known endemic, rare, threatened, or endangered insect species; however, a more thorough investigation is warranted due to uncommon habitats within the reserve, such as potholes, crevices, shelter bluffs, and pinyon-juniper communities. A commonly encountered insect within the reserve is the Yellow-jacket genus. Their obvious population and frequency is due to the sugar and moisture associated with garbage at collection sites. House Flies and Horse Flies are also quite common due to livestock grazing. In no case, can it be said that

insects create an undue nuisance to visitors or are found in epidemic proportions.

Arachnids

Arachnids species are also unverified; however, no known documentation of rare, threatened, or endangered species exists. Scorpion and tick species do occur within the Reserve, and Black Widow spiders have been verified.

PESTS

NPS *Management Policies* (1988, Chapter 4) defines pests as animal or plant populations that interfere with the purposes of a park, and calls for the management of exotic plant and animal species, up to and including eradication, wherever such species threaten park resources or public health and when control is prudent and feasible. City of Rocks contains 63 species of non-native plants (see appendix). These non-native plants occur primarily in disturbed areas such as roadsides, trails, and grazed lands. CIRO is mandated to protect and interpret the historic scene, some exotic plants naturally would be excluded from management aimed at eradication. Which plants will stay and which will go have yet to be determined; therefore, defining what is a plant pest at CIRO needs to be determined. Suffice it to say that CIRO has many plant pests.

Other pests within the reserve include unnatural concentrations of yellowjackets around garbage cans, and possibly forest insects in spruce-fir-lodgepole stands. CIRO has no known vertebrate pests, although no inventory has yet been conducted. Some birds within the reserve are classified as non-native. European Starling, House Sparrow, Rock Dove, Ring-necked Pheasant, Gray Partridge, and Wild Turkey are all non-native, but it is not known what influence they have on the native populations of plants or other animals.

The existing and future headquarters located outside the reserve in the town of Almo, will house the museum collections. Any potential pests, particularly rodents, insects, and museum pests, that may be

manifested should be considered in an Integrated Pest Management Plan as part of the planning process for storage facilities in the design of the new headquarters.

HUMAN ACTIVITIES

The City of Rocks encompasses a number of human uses. These uses are grazing, mining, and recreation. Livestock are grazed on 10 allotments covering 24,000 acres of private and public range on U.S. Forest Service, Bureau of Land Management, and reserve land by ten individual permittees. Currently there are approximately 1,592 active (AUM's) available for the 10 allotments, with an estimated 504 active within the reserve. In the reserve, 6,122 acres of the allotments cover federal land. Livestock are grazed on an additional 6,791 acres of private land.

Recreation

The multitude of impressive rock features within the reserve and the topography of the rural landscape provide a wealth of recreational opportunities. Studies show that camping, hiking, and rock climbing are major recreational activities within the reserve. Most activity occurs on the weekends and visitors in the area during the week are usually climbers.

Camping

Demographics indicate that most campers come from Idaho and Utah. A further breakdown shows that roughly 50 percent of the campers are from Idaho, 40 percent from Utah, and 10 percent from other states.

Visitors currently camp in 78 designated campsites. Each campsite is capable of holding 8 people and 2 vehicles. There are also 3 group campsites which hold up to 20 people. The price for an 8 person campsite per night is \$6. There are also 20 backcountry camps which require a permit. These camps are located in the Indian Grove area. Campsites are encroaching upon the surrounding resources and in some sites there are erosion problems. Most campsites are equipped with grills and picnic tables.

The BLM and Forest offer camping areas near the reserve. There are limited improved Forest campgrounds within 15 miles of the reserve.

Hiking

According to a survey conducted at City of Rocks in March 1992 by the University of Idaho, 44% of those surveyed participate in hiking during their visit. That percentage is likely to increase as trail signs, maps and the trails themselves are improved. Traditionally, hiking has been primarily bushwhacking from point A to B. The trend is toward more organized and managed trail use. Currently, there are 16 miles of trails within the reserve. Roughly half are little more than social paths or game/cattle trails. The heaviest used trails are those which lead to a unique feature or popular climbing site. These include: Camp Rock Trail, Elephant Rock Trail, Bath Rock Trail, Flaming Rock Trail, and South Fork of Circle Creek. Only a few permits are issued each year for backcountry camping, which suggests that backpacking currently is not a main use of the trails.

The current condition of the hiking trail system within the reserve is being upgraded. Erosion is a major problem. Visitors are impacting resources by not using existing trails, thus adding to erosion damage. Most visitors that come to the reserve are involved in different levels of hiking.

Climbing

The majority of public use at City of Rocks is climbing-related. Currently, those who climb at City of Rocks range from local individuals and families to foreign climbers touring the United States. Presently, there are four professional rock climbing schools licensed to instruct and guide in the Reserve. In addition, local schools, youth and safety groups use City of Rocks as a training ground. There is also a significant amount of scrambling on the more accessible rocks by non-technical climbers. Climbing at City of Rocks is attracting a greater number and a greater diversity of people than ever before.

Today, more than 600 established technical routes exist in the Reserve. Most climbing is concentrated

on popular crags near existing roads. The majority of technical climbing routes are rated 5.7 to 5.11 (Yosemite decimal system). While many routes which are primarily protected by removable hardware are also done, the principal style of climbing is on bolt protected faces. There is little climbing activity in less accessible areas of the Reserve though exploration continues.

Most of the bolts on climbing routes were placed on rappel, using power drills, to create technically difficult routes and to increase safety. Gymnastic chalk is widely used.

City of Rocks has been recognized as having some of the country's most difficult climbing routes. In 1990-1991, new route development decreased dramatically. In fact, all climbing-related activity at City of Rocks (with the exception of commercial operations) seems to have plateaued. This change may be due, in part, to the discovery of new climbing areas located in the Southern Idaho and Northern Utah region. The shift may also be a reaction to increased regulation, and a more crowded environment than climbers experienced as recently as five years ago.

The relationship between climbers and the local populace is mixed. The people of the communities adjacent to City of Rocks are very friendly and individual contacts are usually positive. There are, however, significant concerns over the sanctity of private property and anticipated financial gain from increased visitor presence at the National Reserve. Nearly one half of the approximately 14,000 acres within the Reserve boundary is in private ownership. Several rocks with significance to climbers are on private property with no current resolution to restricted access. The majority of historic rocks possessing signatures of early travelers along the California Trail are also on private property. Several of these "signature rocks" also possess notable climbing routes. One route on Treasure Rock, for example is considered the most difficult of its kind, anywhere in the world. Conflicts between climbers and landowners are infrequent.

The visiting public generally looks upon climbing with fascination. Visitors typically enjoy the opportunity to watch climbing while driving through the Reserve or while walking along the base of convenient crags. Conflicts between climbers and other visitors are uncommon.

Prior to the establishment of the National Reserve, climbing was unregulated. There have been positive, proactive actions taken by climbers to protect and restore the environment and to protect historic inscriptions which have been largely successful, however, more effort is needed. Regulations which restrict power-drilling and rock alteration are in effect at City of Rocks. A few seasonal closures have also been imposed on crags to protect nesting raptors.

The most obvious factor affecting climbing at "The City" is the increased visitor use due to knowledge of City of Rocks outside the local area. One of the consequences of this publicity is the overcrowding of existing campsites and an overflow into non-established sites. In addition, the erosion of stock trails, now also used by climbers and other visitors, has accelerated.

At City of Rocks, cooperative efforts have been made among the climbing community, the Access Fund and City of Rocks National Reserve managers to mitigate climbing-related impacts. In 1991, a major trail stabilization project and trailhead improvement project was accomplished. Several new outhouses were constructed and climbing information brochures, trail signing, a trailhead display, and bulletin board were planned. Members of the climbing community and other Reserve users were also invited to assist in the development of an interim climbing management plan for City of Rocks National Reserve. The current management of climbing at City of Rocks encourages an active role by climbers in resource protection.

Other forms of recreation include picnicking, horseback riding, mountain bicycling, motorcycling, off-road vehicle (ORV) use, hunting, cross-country skiing, snowmobiling, pine nut gathering, sightseeing,

and photography.

Picnicking

Many tourists and climbers enjoy picnicking while in the Reserve. It's hard to say exactly how many people picnic in the reserve, however there is heavy use on most weekends which cause parking problems and overuse at some campsites with picnic tables.

Horse back riding

At the present time, horse back riding is permitted throughout the Reserve. Several wagon trains pass through the Reserve every summer. Most of the horse back riding within the Reserve is through Indian Grove and parts of the inner city. Horse back riding is increasing every year.

Mountain Bicycling

At the present time within the Reserve, mountain biking is allowed on existing roads only. A private-published climbing guide shows loop trails across unmaintained roads. These particular trails cross private ground and permission must be obtained from the landowner. Mountain bikers use the existing trail system also. This causes much resource damage. Climbers and scout groups are the main users of mountain bikes.

Motorcycling

Motorcycling is allowed on existing roads. Bikes must be road worthy and licensed.

Hunting

Currently, hunting is only restricted in section 36. Deer, bird, cougar, and small animals are among the most hunted game animals within the reserve. Hunters with dogs frequently track and chase cougars within the reserve. The exact number of game taken each year is unknown. Idaho State Fish and Game can give estimates but no exact numbers have been established. Hunting within the Reserve has not yet been a major problem, but laws need to be established and enforced to insure a problem free future.

Cross-country skiing

There are many opportunities for cross-country skiing within the Reserve. Currently, the use is light. When roads are closed during the winter months, skiers use them as skiing trails.

Snowmobiling

As with skiing, snowmobiling is done on the roads within the Reserve when they are closed due to deep snow conditions. Snowmobiling is the major winter activity within the Reserve.

Pine nut gathering

Pine nut gathering is a common practice native to this region. Pioneers and Indians came to this area to gather pine nuts. Today, local members of the community, Native Americans, and tourists continue this practice.

Sight seeing

The City of Rocks is a haven for sightseers throughout the world. Sightseeing is becoming more popular as the visitation of the Reserve increases.

Photography

Many photographers and tourists travel great distances in order to photograph the myriad of flowers and impressive granite structures that exist within the Reserve.

Some commercial photography has been done for climbing magazines and climbing related commercials. It is necessary for these commercial ventures to obtain a photograph permit.

Mining

Within its boundaries, the City of Rocks had one mining claim, declared abandoned and void by the Bureau of Land Management in February of 1991. The only workings were two shallow bulldozer cuts, each 500 feet long. There are also two abandoned sand and gravel pits; both are partially reclaimed. A plugged and abandoned exploratory well and two abandoned mica mines are on private land within the unit's boundary. Local residents believe that the quartz at the abandoned mica mines may have

economic value. However small, the mines could be reopened. The NPS Mining and Minerals Branch (MMB) briefly examined the gold and mica sites. In their current condition, heavy metals do not appear to be concentrated or accessible at these sites, hence degradation of ground water quality is probably not a concern. However, secondary impacts from reactivating the mines could cause groundwater contamination. MMB also reviewed plugging data for the well site. The well appears to be properly plugged. An improperly plugged well or contaminated soil at the well site (e.g., if chemicals or petroleum products were spilled at the site) may also lead to groundwater contamination. The reserve suspects that soil contamination is inhibiting plant growth within a 30-foot diameter of the well casing. The site should be investigated to determine factors inhibiting plant growth. Contaminates may also be washed into the surface waters. Erosion at all mine sites may also cause degradation of surface waters. To closely examine mine and well impacts to surface and groundwater, the reserve may contact the MMB and the Water Quality Division for assistance.

Grazing

Domestic livestock grazing in the City of Rocks can be traced back to the first immigrant wagon trains passing through on the newly established California Trail in 1843. In 1848 the Hudspeth Cutoff began funneling even more wagon trains through the area (Young and Sparks 1985). As the immigrants trailed through and camped in the vicinity of the City of Rocks, their livestock grazed the forage. Undoubtedly, these livestock left their impact on the vegetation in the region.

In 1867 Joseph Pattee wintered cattle in the Raft River Valley, although they probably did not get to the upper end of the valley near the City of Rocks. This paved the way for the establishment of the first ranch in the Raft River Valley by J.F. Shirley and C.S. Gamble in 1869 (Young and Sparks). Their headquarters were located at the mouth of the Raft River, but with 3,000 head of cattle the first year and over 10,000 cattle the next year, it is likely their cattle grazed in and around the City of Rocks.

From the late 1870's to the early 1880's Mormon settlements began to be established in the valleys adjacent to the City of Rocks (USDI-National Park Service 1991). They dry-farmed much of the area that is now in private ownership in the City of Rocks until the 1920's and also grazed livestock in the area. The drought and severe agricultural depression following World War I resulted in many of the dry farms being taken out of cultivation and grazed by livestock. Private ownership of land now within the reserve were obtained under the various Homestead Acts (Sharp and Sanders 1978).

The Cassia and Raft River National Forest Reserves were established in 1905. Control of livestock grazing began on the land formerly administered by the US Forest Service (USFS) in the City of Rocks at that time. Uncontrolled livestock use continued to occur on lands formerly administered by the Bureau of Land Management (BLM) in the City of Rocks until passage of the Taylor Grazing Act in 1934. This uncontrolled use resulted in a substantial alteration of the native vegetation. The native perennial grasses decreased in abundance and productivity, allowing sagebrush and juniper increase. While overgrazing by livestock in the late 1800's to early 1900's contributed to the increase in brush, other factors such as control of fires, greater seed dispersal and an overall climatic shift also were a factor (Burkhardt and Tisdale 1969).

The physical features of the City of Rocks and surrounding valleys and mountains create an environment well suited to the production of livestock. The mountain areas provide ample summer grazing, foothills and plateau lands sustain animals during the spring and fall and the lower valleys and irrigated lands furnish feed and forage through the winter months. The interrelationship of private and public lands is such that if any part of this cyclic grazing pattern is removed, it would be difficult for a ranch to continue to operate (Sharp and Sanders 1978).

When the dry farms were abandoned in the 1920's, the land was slow in reverting back to the natural

vegetation and forage production was limited. With the availability of crested wheatgrass (*Agropyron desertorum*) in the late 1940's and 1950's, much of this land was recleared of brush and seeded to crested wheatgrass. Prior to seeding crested wheatgrass, the availability of spring and fall forage generally determined how many cattle a ranch could run. The crested wheatgrass seedings also gave the associated depleted native ranges an opportunity for recovery and improvement in ecological condition.

The economic livelihood of the permittees using the allotments addressed in this plan is largely dependent on their being able to continue grazing the current number of livestock. Continuation of grazing in the City of Rocks is not only important to their economic well being, but also to the economy of the local community of Almo.

Most of the private land in and surrounding the reserve is used for domestic livestock grazing. Livestock grazing is important to the regional economy. Most of the public lands are divided into grazing allotments, and the area ranchers rely heavily on federal rangelands. The U.S. Forest Service, Bureau of Land Management, and now the National Park Service administer 10 allotments in and around the reserve. Currently, there are 10 permittees grazing cattle on 6,122 acres of public land in the reserve with an estimated 504 active animal-unit months (AUMs). Livestock are grazed on another 6,791 acres of privately owned land. Grazing is excluded from the remaining 1,633 acres of public land in the research natural area, state-owned section 36, and other federal land not within a grazing allotment. The heaviest cattle grazing occurs from June through October. Ranchers that graze cattle in or near the reserve frequently trail cattle across the reserve from one allotment to another.

The Reserve administers four of the permittees that have allotments within the Reserve. The BLM administers the other permits that are held within the Reserve on public land. The four permittees administered by City of Rocks have 349 AUMs and have signed a special use permit with CIRO.

ARCHEOLOGY

Until establishment of the reserve, there was only one archeological site and several "chipping" sites known within City of Rocks. However, a recent archeological survey discovered a number of sites and indicates a much greater prehistoric Native American use than previously expected. Several of these newly discovered sites possess remains of pottery that seem to imply a long period of use of the area for seasonal pinon "pine nut" gathering. The recent discoveries, along with the borderland nature of the City of Rocks, which is located between the northern Basin and Range country of the Inter-mountain West, represent cultures of both the western Utah/ Nevada area and the Shoshone-Bannock cultures farther to the north, suggesting that archaeologically City of Rocks may be richer than initially expected. It is also believed that roving and raiding parties from more distant areas passed through the reserve, including Ute, Paiute, Nez Perce, Crow, Blackfeet, Comanche, Flathead, and Assiniboine. While there is some speculation that native peoples were using City of Rocks as early as 12,000 B.C., direct evidence places occupation over the last 4,000 years.

HISTORY

Prior to the 1840s Pocatello's Northern Shoshoni band ranged over a broad expanse of country from upper Goose Creek and the upper Humboldt-Thousand Springs area to Raft River, with City of Rocks as a central feature of this territory. More possessive than many other North Shoshoni, they tended to exclude others from utilizing the region. Sometimes referred to as "wild wheat-eaters", Pocatello's people were dependent on hunting and gathering of seeds and roots. They harvested pine nuts around City of Rocks. That crop, isolated from other pine nut areas farther south, gave Pocatello's band a distinctive culture.

Competition between American and British fur trading interests accounted for white discovery and penetration of the City of Rocks area. Discovered in 1826 by Peter Skene Ogden's Snake Brigade, the

Granite Pass and City of Rocks area offered little attraction to fur hunters because it possessed modest beaver resources. When Ogden's trappers ascended the Raft river and crossed Granite Pass to reach Goose Creek on June 11, 1826, they concluded that the vicinity offered poor fur resources.

In 1830, John Work ascended the Raft River to near City of Rocks, where he encountered a buffalo herd and six beaver which his men caught. British trappers did not return to the City of Rocks country after Work concluded that it lacked enough beaver to justify further attention.

American mountain men who competed with Hudson's Bay Company trappers attempted to find new routes between the Great Salt Lake and California. All of the explores routes indicated exceptional problems for passage from Utah directly west into Nevada--findings that eventually led to a reexamination of Granite Pass. Returning from a California expedition in 1834 Joseph R. Walker followed an upper Humboldt - Goose Creek route that took him close to Granite Pass. After 1840 Walker and other mountain men shifted from trapping to guiding overland emigrant parties.

In 1842 Joseph B. Chiles brought a small California party back to Missouri to open a practical emigrant road for later migration. Chiles had been with the Bidwell-Bartleson party which had gone overland to California the previous year. The route used had proven that the Bonneville salt flat west of Salt Lake was unsuitable for wagon traffic. Ascending a Humboldt route already utilized father west, Chiles' party discovered Granite Pass which provided the needed route. Chiles sent his main California trail emigrant party via City of Rocks and Granite Pass in 1843 under the direction of Walker, his long-time friend, and thereafter regular California trail emigrants passed through City of Rocks.

By 1846 Granite Pass and City of Rocks began to accommodate overland emigrants to Oregon. To avoid obstacles on the regular Oregon trail Jesse Applegate explored a southern Oregon connection to

the California Trail, thus bringing Willamette Valley wagon trains that adopted Applegate's route through City of Rocks and Granite Pass.

In 1848 Mormons passing overland from California to Salt Lake found that after passing through Granite Pass they could diverge over a new direct route from City of Rocks to Salt Lake without going to Fort Hall. H.W. Bigler's Mormon battalion group, completing its long trip to Utah from California, met Samuel J. Hensley who apprised them of such a route that he had just traveled. Abandoning plans to go to Fort Hall, Bigler's men opened the new route (named the Salt Lake Alternate) in time to accommodate California Gold Rush overland wagon traffic that desired to detour via Salt Lake City on the journey west.

The traffic through City of Rocks greatly increased as the gold fever spread. In 1852, fifty-two thousand people passed through City of Rocks. The number of trails began to increase as the demand for supplies became apparent. Minor conflicts and incidents were recorded between emigrants and American Indians and a few lives were lost on both sides. Other losses occurred in supplies and animals.

The section of the California Trail which passed through the City of Rocks itself was sometimes called the Fort Hall Road, and it passed near two large conical rock formations, called the Twin Sisters, which mark the southern edge of the City of Rocks. Just south of these landmarks, the California Trail connected with the Salt Lake Alternate. Approximately nine miles of emigrant trails are located within the present reserve boundaries and represent some of the best preserved segments of overland emigrant trails in the nation.

The City of Rocks area provided emigrants with a passage around the marshes of the upper Raft River, as well as sheltered campsites with a good water supply and pasturage for their animals. Many tar-filled inscriptions carved into the soft granite columns at City of Rocks are still discernible today, evidence of pioneering expeditions who visited the valley in the

nineteenth century. Three major groups formed the overland migrations who passed through this area-- pioneer families moving to California and Oregon, Mormons searching for a permanent settlement, and thousands of California 49ers heading west for the gold fields. The number of overland travelers reached its peak in 1852 when some 52,000 people passed over the California Trail and through the City of Rocks. Many of the overland emigrants recorded their trips in diaries and other accounts, revealing considerable data on the trails and their impressions of City of Rocks, a landmark spectacle that soon gained widespread fame as a leading attraction along the California Trail. One such emigrant, James F. Wilkins, identified the monumental granite assemblages as "The City of Rocks" by August 12, 1849, and the appellation soon gained general acceptance.

At various times during the 1850s transcontinental mail and express service was conducted via City of Rocks and Granite Pass. This service, however, was hampered by severe winter weather, Indian attacks in the southern Idaho-northern Nevada region, and financial difficulties of the operators.

The impacts of two decades of wagon traffic on his people's way of life, which included overgrazing, depletion of game, and loss of other food sources, caused Pocatello to have his warriors attack several California Trail groups near City of Rocks in early August, 1862. These and other incidents, including six or more documented battles (newspaper reports of which were often exaggerated) that took place near Almo after September 1860 in which a number of people were killed, led to military retaliation. As a result of military resistance Pocatello agreed to negotiate a treaty at Box Elder, Utah, on July 30, 1863, providing compensation for the Indians in exchange for the emigrants' unobstructed access to their routes, including the vicinity of City of Rocks. By the late 1860s Pocatello decided that his band would be better off settled on Fort Hall Reservation, and he arranged for a Bannock Creek home. Thereafter, City of Rocks received little attention from the Shoshoni except for small family groups that

traveled there to harvest pinyon pine nuts.

Following completion of the transcontinental railroad in 1869, a road was developed from Kelton, Utah, to Boise, Idaho, to provide a connection for postal service, express, and freighting operations between the railroad and the burgeoning mining communities of southern Idaho. As a result a stage station at the junction of the old California Trail and Salt Lake Alternate just south of Twin Sisters served the thriving Boise-Kelton traffic until 1882 when construction of the Oregon Short Line Railroad supplanted all stage and freight service through City of Rocks. The original stage station structures are no longer extant, the present log structures at the site having been built during the early 1930s with materials salvaged from the earlier buildings to serve farming and ranching purposes.

The area was first grazed by buffalo and other large mammals which were encroached upon by wagon stock. Large numbers of animals accompanied travelers of the trail and sometimes numbered in the thousands. This concentrated use altered the original type of vegetative and distribution of the landscape, but it remained plentiful enough to support large cattle herds during early ranching in the Raft River Valley. Cattle ranching began in the City of Rocks vicinity in 1875 partially in response to the growing market for meat by the expanding Idaho mining communities. A natural corral west of Castle Rock and below Graham Peak led James Q. Shirley, who had joined Lou Sweetzer in introducing a herd of 2,000 Texas longhorns to upper Raft River, to fence a cove ranch site and build a modest ranch house at City of Rocks. Other ranchers soon moved into the area.

Limited tracts of good ranch land in the City of Rocks area soon led to population expansion in adjacent areas. From the late 1870s to the early 1890s Mormon settlements began to dot the valleys adjacent to City of Rocks. These agricultural settlements depended on the City of Rocks area for their water supply. Homesteaders began to till the soil and plant crops. Shallow wells and new ditches were dug to

ensure a continued water source.

After a severe drought during the late 1880s, dry farming methods, coupled with increasing precipitation, led to expansion of crop planting in the City of Rocks area between the mid-1890s and the 1920s. Sagebrush was cleared, fences were added, and grain and hay crops were planted. Roads in and near City of Rocks were moved to section lines, and plowing brought surface changes to some California Trail segments. During this period the present road was built across the City of Rocks area from Almo to Moulton. Few farm and ranch buildings survive from this era. At least six identifiable ranches were developed in the City of Rocks area during the 1895-1920 period.

More arid conditions and a severe agricultural depression after World War I resulted in retrenchment of dry farming operations in southern Idaho during the 1920s. Mechanized farm equipment eventually permitted some crop cultivation, but a continuing farm recession resulted in consolidation of farm holdings back into stock ranches and grazing operations in the City of Rocks area. Few visible remnants remain of the homesteading era, but photos and homesteading records document the changes to the landscape.

More recent utilization of the City of Rocks area includes fenced livestock ranches and tourist recreation. Section 36 was purchased as state park land in March 1973, and tourists have come to the area in increasing numbers during recent years to take advantage of its opportunities for rock climbing, hiking, picnicking, and camping (Unrau 1990).

STRUCTURES

The few remaining ruins of historic structures are a contributing part of the historic rural scene and help represent the historic continuum of the reserve's history.

CULTURAL / HISTORIC LANDSCAPES

To modern-day visitors traveling along the California Trail through City of Rocks the landscape still looks and feels much the same as it did to the emigrants. The ability to recapture this experience without modern intrusions is one of the most important resources of the reserve. The first major impression is one of enclosure. The vistas here are different from the vistas in the surrounding plains; they are defined by the encircling rocks that alternately close in and open up, adding great variety to the scenery. Circle Creek basin, where many of the emigrants camped, is still an open, expansive valley with a flowing creek, ringed by towering rock formations and offering a sense of security and comfort to plains-weary travelers. The Silent City of Rocks, the crescent shaped basin containing a ring of spires, still retains a quality of mystery and an impressive silence that has awed people for centuries. The Twin Sisters, which have been known by various names, still appear on the horizon at a point just past the inscription rocks, guiding anyone who will follow them across the next open valley to Pinnacle Pass.

ETHNOGRAPHY

Through the documentation of anthropological research, and research by other disciplines, a wide variety of ethnographic resources are known to exist within City of Rocks. These ethnographic resources include natural resources such as plants, animals and geological structures as well as constructed features such as trails, archeological sites and buildings. Most of what we know about ethnographic resources is based on archeology and history, but there is the potential for learning more through ethnographic research with knowledgeable people who once lived in and/or used resources at City of Rocks.

PRESENT STATUS OF RESOURCES

NATURAL RESOURCE BASELINE INFORMATION

This section assesses the current status of baseline information for the reserve. It is structured around the resource categories from the National Park Service Natural Resources Inventory and Monitoring Guideline. City of Rocks has a varied and limited amount of current natural resource-specific baseline information. Since this is the first Resources Management Plan for the reserve since it received reserve status, inventory and monitoring programs will be designed to assemble a collection of natural resource data and to monitor these resources to determine changes, and to provide reference points from which to compare more altered parts of our environment.

AIR QUALITY

Air quality data for the reserve has not been systematically collected, and since the few air quality monitoring stations in the region are located near known pollution sources, the data from these stations probably does not represent City of Rocks air.

SCENIC QUALITY

Protecting and maintaining scenic quality was one of the primary reasons for establishing the reserve. The Comprehensive Management Plan further emphasizes the importance of scenic resources by identifying two categories of exceptional resources: cultural and visual, and natural and visual.

Scenic quality is considered excellent when views contain high degrees of unity, vividness, and visual intactness (naturalness). Seven of 24 viewpoints in the reserve were identified in the Comprehensive Management Planning (CMP) process as having these outstanding qualities. These are described in detail in the CMP, and a complete discussion and ranking of scenic vistas can be found in the study, *Visual Resources Analysis* (NPS 1990).

NATURAL QUIET

To date no baseline evaluation of natural quiet has been conducted, but is necessary while the reserve is relatively uninfluenced by adjacent lands or communities.

GEOLOGY

Geologic Maps

Although geology students enrolled in university field courses, master's candidates and doctoral candidates have mapped in this area, no professional geologic map has ever been published. A GIS-compatible geologic map, mapped in the field at the 1:24,000 scale, is needed as part of the Reserve's natural resource database. Before his untimely death, Dr. Richard Armstrong (University of British Columbia), had completed geological field work in the Albion Range (late 1970's). His field maps remain on repository with the USGS in Menlo Park, CA and would be an appropriate starting point for producing a functional map for resource management. Armstrong's maps should be field checked by a qualified field geologist, and possibly one familiar with Armstrong's work and/or the geology of the Albion, Raft River, Grouse Creek mountain ranges of Idaho and Utah.

(The literature indicates that these three ranges have often been studied in unison.).

Quaternary geology should also be mapped in relationship to bedrock and inventoried for diverse engineering attributes, since the dynamics of surface processes is an ongoing resource management and safety concern.

Bedrock and Quaternary geologic maps will be the foundation for other resource maps that will be directly useable by Reserve managers for resource stewardship decisions. These identified needed maps include a landform map delineating the location and position of pinnacles to aid in resource management (wildlife habitat; cultural resources) and search and rescue operations. The pinnacled area of the Reserve is where climbers concentrate, and the maze-like distribution of pinnacles leads to easy disorientation for those unfamiliar with the terrain. Second, an inventory and assessment of fragile rock formations is needed to help Reserve staff manage recreational activities in an appropriate way to protect these features. Third, a terrain analysis map identifying areas susceptible to erosion and deposition will provide Reserve managers with information needed for planning, safety and land-use decisions.

Accurate mapping will provide guidance in visitor-use management, in the location of new facilities in suitable areas, and in identifying the need to remove or reroute trails and other facilities from unsuitable areas, as well as provide essential guidance to park staff in the development of the trail management plan, grazing management plan, fire management plan, integrated pest management plan, and land protection plan.

SOILS and SOIL EROSION

The U.S. Soil Conservation Service, now the National Resource Conservation Service, has completed a preliminary soil survey for portions of the reserve (July 1986).

Microbiotic soil

It has long been reported in the literature that microbiotic soils, consisting of cyanobacteria, mosses, and

lichens, are an important component of ecosystems in semiarid and high elevational regions of Southern Idaho and Northern Utah. Some of these soils may actually represent up to 70 percent of the living cover in some of these systems. These types of soils are very long lived and are slow to recover from severe disturbance, requiring 40 years or more to recolonize even with small areas. In vegetation zones associated with the reserve, these soils may demonstrate to be the dominant source of nitrogen, which is an often-limiting element for associated bunchgrass/pinyon associations in the park. It is imperative that land managers fully understand the relationships that microbiotic soils have with below-ground ecosystems and mycorrhizal associations as well as with above ground vegetation before one can implement management actions that might drastically affect the biogeochemical cycling with sites such as CIRO. In order to implement fire into many of the vegetation types on the park an assessment of microbiotic conditions must be considered prior to the development of burn units.

WATER RESOURCES

Surface water

Surface water is present in the reserve in only a few locations. A stock pond in NE, NE, Sec 32, T15S, R 24E, is less than an acre in size and generally has some water present year-round. Circle Creek, as it flows across section 31, T15 S, R24E is held back by a series of small check dams which create small ponds less than a ½ acre in size. These stock ponds as well as the one associated with the Boise-Kelton station site (in Section 24, T16S, R23E) are privately owned. Generally, surface water is present in the lower reaches of all forks of Circle Creek through its departure at the Smoky Mountain pass. For most months of the year, surface water is also present in the pools of Bath Rock, Shangri La, and a few other significant ones. The quality of this water has not been tested by the reserve, and little baseline information exists.

A number of springs are found in the reserve, and most are utilized for grazing. Notable springs include: Tea Kettle, Bath Rock, Taylor, Indian Grove, Kempton, Logger, Mica, Button, Willow, Trail Canyon,

Mohogany and Walters Creek. In most cases, a head box is present, and water is piped away from the source for use by cattle.

Ground water

A 70-foot well was drilled at the north base of Breadloaves in 1989, and provides 2.5 gallons per minute. The water has consistently tested to standard. This year a 320-foot well was drilled outside the reserve near Circle Creek to provide water to the proposed reserve headquarters and campground. This well is reported to provide 16-20 gallons per minute. Water quality increases in wells closer to the reserve and decrease in quality east of the reserve in Almo Valley.

Water rights

Idaho's water law is based on the doctrine of prior appropriation. Under this doctrine, the entity that first diverts water for beneficial use has the prior right to use the water, against all other appropriators who may wish to use water later. The federal government also may hold federal reserved water rights, which arise from the purposes for which the land is reserved. City of Rocks is entitled to federal reserved water rights on that portion of the reserve acquired from the Sawtooth National Forest, and the amount claimed is for the minimum necessary for national forest purposes. The reserve's establishing legislation provided that the federally reserved water rights for that portion of Sawtooth National Forest acquired by City of Rocks National Reserve be transferred to the reserve. However, it excluded the creation of new federally reserved water rights for national park purposes.

Idaho is currently undergoing an adjudication of water rights for the Snake River Basin. Water rights on public lands within the reserve have been filed on by the Idaho Department of Parks and Recreation. All issues concerning water rights will adhere to congressional intent as stated in Public Law 100-696, Section 202.(d) (2) and (f).

Floodplains (riparian areas)

No floodplains have been mapped along streams in the reserve. Because all of the streams are high- to medium-gradient streams of relatively small size, it

was assumed that 100- to 500-year floodplains do not extend far beyond the riparian areas associated with the streams. Consequently, City of Rocks was zoned as an area of minimal flooding by the Federal Emergency Management Agency. The creeks and drainages of the reserve are subject to flooding during summer months when thunderstorms can produce large quantities of precipitation in a localized area. The hazards from these summer floods are considered minimal.

Wetlands

Wetlands in the reserve have been mapped from aerial photos by the U.S. Fish and Wildlife Service and the National Park Service. The wetlands map for the reserve is for orientation purposes only and is not intended to represent jurisdictional wetland boundaries. Site-specific wetland studies would be required to identify the precise location of wetland boundaries.

VEGETATION

The reserve's flora was inventoried in 1991 and 1992 by Karl E. Holte, PhD Professor of Botany at Idaho State University, and by Albion, Idaho resident, Thomas John. Their resulting publication of January 1993, entitled Vascular Flora of City of Rocks and Vicinity: A Preliminary Checklist, documents 450 species within the reserve. It is believed that only 3-5% of the reserve's flora has yet to be verified.

Only one other study of the reserve's flora is known. In October 1993, Robert K. Moseley, Plant Ecologist with the Idaho Department of Fish and Game published The Status and Distribution of Christ's Indian Paintbrush (*Castilleja Christii*) and Davis' Wavewing (*Cymopterus Davisii*) in the Albion Mountains, Sawtooth National Forest and City of Rocks National Reserve. The study determined that Davis' Wavewing occurs on Graham Peak within the reserve, is endemic to the Albion Mountains, that its population is local and rare, and that the National Park service should treat Davis' Wavewing as a sensitive species in developing management plans at City of Rocks National Reserve.

The Idaho Department of Lands declared, in 1973, an individual of *Pinus monophylla* (Single-leaf Pinyon)

within the reserve as the Idaho Champion Tree. Its location and status has not been verified in recent years.

Rare, Threatened and Endangered Plants and Animals of Idaho, published in March 1990 by the Idaho Department of Fish and Game, lists *Pediocactus simpsonii* (Simpson's Hedgehog Cactus) as a sensitive species. This designation means that the species is localized and that its population may be jeopardized without active management or removal of threats. Simpson's Hedgehog Cactus is known to grow in many areas above 7,000 ft elevation, including the overlook proposed at Indian Grove, and on Graham Peak.

The reserve's vegetation was classified and mapped in 1992 by the Cooperative Parks Studies Unit (CPSU), at the College of Forestry, Wildlife and Range Science, University of Idaho. Map and data was generated using ARC/INFO ver. 6.0.1. This map is on file at the Reserve. Another vegetation map was prepared by mapping professionals in the Geographic Information Systems Division of the Washington Office of the National Park Service, using the 1987 1:40,000 National Aerial Photography Program, color infrared photography, although professionally accepted techniques for photointerpretation, mapping, and digitizing were used in the development of this product, this map has not been field verified for accuracy. U.S. Fish and Wildlife Service National Wetland Inventory data have been merged with the mapped vegetation classes, but ground truthing is needed to address questions raised regarding accuracy.

WILDLIFE

No known surveys or studies concerning City of Rocks invertebrates have been published. A species of freshwater shrimp was supposedly identified as inhabiting the potholes of Bath Rock and other pools; however, this information has yet to be confirmed to NPS standards. No official list of vertebrates has been published for the reserve, and to date all information of presence or absence of vertebrates is primarily based on observation by employees. A few individual species have been studied and are worthy of note.

Charles H. Trost, Ph.D., with the Department of Biological Sciences, Idaho State University, conducted a field survey of bird species within the reserve prior to 1990. This list has served as ground work for other lists and studies. Mike Britton, wildlife biologist for the Rocky Mountain Regional Office of the National Park Service, conducted a survey of the birds of the reserve in July, 1991. Some additions were made based on this list. In June 1995, CIRO Chief Ranger, Wallace Keck, began a daily observation record for birds within the reserve and Almo Valley as background data for an official list. This list is due to be published in early 1997. Other noted birders have visited the reserve and submitted their lists of sightings which includes new data. Rick Taylor, amateur birder and City of Rocks volunteer, conducted a survey under the direction of the reserve, to determine nest distribution of birds of prey, as well as presence or absence of species. This survey was conducted during the summer of 1996.

During the summer of 1995 Lyle Lewis, Idaho State Ecologist, conducted a survey for bats. Utilizing mist nests, Lewis was able to catch and release ten bats representing three species. The largest mammal study conducted at City of Rocks is: Laundre, J.W. 1991. *Behavior, Ecology, and Conservation of Mountain Lions in Fragmented Habitat*. This study began in 1985 and is slated to continue through the year 2,000. The study confirms that the reserve contains important mountain lions habitat, and that their presence here is well documented.

INTEGRATED PEST MANAGEMENT

Included in Tom John's Vascular Flora of City of Rocks National Reserve: An Annotated Checklist, January 1995, was the notation of 63 species of non-native plants. No attempt was made in this publication to distinguish between non-native plant and a plant pest. This determination will be made in CIRO's prospective IPM plan. Currently, the Columbia Cascade Cluster of the National Park Service has contracted with the University of Idaho to map the non-native plants within the reserve. This two-year project is scheduled for completion in late 1997. An assessment of forest pests has not been made. In early summer of 1997, CIRO staff plan to meet with

a USFS plant pathologist to initiate this assessment.

Exotic plants found within City of Rocks National Reserve:

Amaranthus albus, Tumble Pigweed
Amaranthus retroflexus, Redroot Pigweed
Carum carvi, Caraway
Conium maculatum, Poison Hemlock
Pastinaca sativa, Wild Parsnip
Arctium minus, Common Burdock
Centaurea maculosa, Spotted Knapweed
Chicorium intybus, Chicory
Cirsium arvense, Canada Thistle
Conyza canadensis, Canada Fleabane
Lactuca serriola, Prickly Lettuce
Sonchus asper, Prickly Sow Thistle
Tragopogon dubius, Yellow Salsify
Tragopogon porrifolius, Purple Salsify
Myosotis micrantha, Forget-me-not
Alyssum desertorum, Desert Alyssum
Camelina microcarpa, Flase Flax
Capsella bursa-pastoris, Shepherd's Purse
Cardaria pubescens, Hairy whitetop
Chorispora tenella, Musk Mustard
Descurainea sophia, Flixweed Tansy Mustard
Lepidium camprestre, Fieldcress
Lepidium perfoliatum, Claspig Pepperweed
Sisymbrium altissimum, Tumble Mustard
Spergularia rubra, Red Sandspurry
Chenopodium album, Lambsquarter
Halogeton glomeratus, Halogeton
Kochia scoparia, Summer Cypress
Salsola iberica, Russian Thistle
Medicago lupulina, Black Medic
Medicago sativa, Common Alfalfa
Melilotis alba, White Sweetclover
Melilotis officinalis, Yellow Sweetclover
Trifolium pratense, Red Clover
Trifolium repens, White Clover
Marrubian vulgare, Horehound
Nepeta cataria, Catnip
Malva neglecta, Roundleaf Mallow
Plantago lanceolata, English Plantain
Polygonum aviculare, Prostrate Knotweed
Populus alba, White Popular
Populus x canadensis, Carolina Popular

Veronica anagallis-aquatica, Water Speedwell
Veronica biloba, Speedwell
Hyoscyamus niger, Henbane
Solanum dulcamara, European Bittersweet
Solanum triflorum, Cutleaf Nightshade
Agropyron desertorum, Crested Wheatgrass
Agrostis stolonifera, Redtop
Apera interrupta, Windgrass
Avena fatua, Wild Oats
Bromus commutatus, Hairy Chess
Bromus inermis, Smooth brome
Bromis japonicus, Japanese Chess
Bromis tectorum, Downy Chess
Dactylis glomerata, Orchard Grass
Festuca pratense, Meadow Fescue
Festuca rubra, Red Fescue
Lolium perenne, Perrenial Ryegrass
Phleum pratense, Timothy
Poa annua, Annual Bluegrass
Poa bulbosa, Bulbous Bluegrass
Thinopyrum ponticum, Tall Wheatgrass

There currently is no inventory of animal pests.

PRESENT CONDITION of NATURAL RESOURCES

This section summarizes the condition and associated values of natural resources described in the introduction, and the nature and severity of major threats to them.

AIR QUALITY

Due to the low population density and lack of large emission sources near the reserve, air quality is generally very good. Areas in Idaho that do not meet air quality standards are restricted to two sites in the southern portion and two sites in the Panhandle. The four sites exceed PM_{10} standards, and one of the four exceeds carbon monoxide (CO) standards.

Wet deposition of pollutants in the region is also low for S and N, although concentrations of pollutants can be quite high in the arid environment. As is the case with much of the western United States, pollutant concentrations in precipitation are low on a regional basis and generally are high only at the local level.

Population projections for Idaho are quite low and also indicate a declining trend. There are no population centers in the vicinity of CIRO, and population trends do not suggest cause for immediate concern related to increased emissions associated with population growth. Emissions of SO_2 , CO, and lead decreased in 1985 to 1987 and have since remained stable. Because Idaho's air quality meets National Ambient Air Quality Standards (with the exception of four nonattainment areas for PM_{10}), no published values are available on emission projections. Air quality in Idaho is expected to remain high for the foreseeable future.

Craters of the Moon National Monument, about 135 miles north of the reserve, has more pristine visual air quality than any other NPS monitoring site in the continental United States. However, air quality monitoring data at Craters of the Moon show a trend

in deterioration, with significant decreases in visibility in recent years (NPS, 1991, Malm, et al. 1994). City of Rocks visual air quality is probably deteriorating similarly to that at Craters of the Moon. Even slight increases in air pollutants could cause major decreases in visibility.

Air quality is important for health, visitor enjoyment, scenic vistas, and preservation of natural systems and cultural resources. Many elements of a park environment are sensitive to air pollution. Notable air-quality-related values at City of Rocks are visibility and scenery.

SCENIC QUALITY

Scenic quality is currently one of the reserves best resources. The few and widely scattered artificial lights in the Raft River Valley and relatively pollution free skies has made the area a premier star-gazing site. Air pollution can be a visual problem when inversions occur. Prevailing winds and the orientation of the Albion and Raft River Mountains may provide some deflection of air pollution. Smoke from range fires as far away as Oregon and Northern California are common in late summer; and smoke from prescribed natural fires and wildfires in the Twin Falls and Albion Ranger Districts of the Sawtooth National Forest are currently the greatest impacts to the reserve's scenic, as well as, air quality.

At present there are few non-atmospheric threats to the scenic quality of the reserve. Potential threats include rock quarry operations on the east side of Middle Mountain and the west flank of the Albion Range, and rock slab stack yards in Moulton. These activities can interrupt westward views of the California Trail from the reserve to Granite Pass.

The Bureau of Land Management has recently permitted the harvesting of Pinyon and Juniper on Smoky Mountain for use as Christmas trees and posts. This activity will not be noticeable from most viewpoints within the reserve, but will directly intrusive of views from the proposed headquarters and campgrounds. Coordinated management of this

area is critical to protect the scene of the California Trail as it enters the reserve through Smoky Mountain Pass.

Currently, views into either Almo Valley or Junction Valley remain pastoral and reflect the historic scene found within the reserve. As Almo Valley grows (which some view as inevitable), the pastoral scene may change. Cassia County has zoned much of the private land which can be seen from the reserve as "Historic Preservation Zone". All new structures must conform to architectural standards developed by Utah State University and approved by Cassia County. These standards will to a large degree provide the needed protection.

NATURAL QUIET

For much of the year "silent" City of Rocks is as quiet of an experience as one would find anywhere in the U.S. During winter, snow absorbs almost all sound, and the lack of visitors nearly precludes all human sound. During summer, intrusion into the natural quiet come in many forms: cattle, human voices, automobiles (especially street legal motor bikes), clanging of metal climbing gear, and occasionally radios at campsites. Perhaps the most intrusive sound is caused by aircraft overflights. Military aircraft (cargo and fighter jets) are observed and heard an average of twice a week during the summer. On occasion a squadron of 4-5 planes may pass at very low altitude directly over the reserve, creating a deafening noise, especially when the sound barrier is broken. Commercial Aircraft are frequently observed but rarely heard due to the higher altitudes at which they fly.

Noise that is disturbing to other people or wildlife is considered an impact. To protect the natural quiet, Cassia County enacted an ordinance in 1991 which prohibits the operation of a motor vehicle, motorized toy or audio device which makes unreasonable noise under particular time, place and conditions within the reserve. Idaho Department of Parks and Recreation also enforces (IDAPA)26, Title 01, Chapter 20, 175.02, which states: *Amplified sound, poorly*

muffled vehicles, loud conduct or loud equipment are prohibited within lands administered by the department, except in designated areas, or by authority of the park manager.

GEOLOGY

Geological features, and their cultural, natural, and recreational values, are the primary resource that led to establishment of the reserve. Resource stewardship at City of Rocks hinges on the collection of sound geologic data and accurate resource maps. As a new park, management programs are now being set in place and plans are being made to develop facilities to accommodate the Reserve's increasing visitation. Erosion is occurring due to social trails, dirt roads, haphazard campsites that remain from before establishment of the Reserve, and on-going grazing. Erosion poses a serious, accelerating, and difficult-to-reverse resource threat. Repairing eroded roads and trails is a recurring maintenance problem. Streams have become locally entrenched and sediment-choked elsewhere, diminishing riparian health and impacting sections of the California Trail.

The geologic resources and associated physical processes of City of Rocks are the primary significant resource affecting all other resource values in the Reserve. The geology of City of Rocks is identified as the second highest interpretive priority in the Comprehensive Management Plan, second only to the California Trail corridor. Yet it is the landscape that provides the unique significance to this segment of the California Trail. The landscape encompasses an array of granitic spires, some of which include major landmarks along the California Trail and signatures of pioneers. These granitic pinnacles are also popular among climbers, provide a diversity of sheltered habitat for wildlife and raptors, and influence soil development and vegetation. Effective cultural and natural resource stewardship and management of recreation, such as designing a trail system to fit the terrain, and relocate and engineer road segments, depends upon knowledge and understanding of the geologic and soil resources and the physical processes affecting them.

SOILS AND SOIL EROSION

The majority of soils in the reserve are highly erodible. Wind erosion potential is moderate for some soils in the reserve. Water erosion hazard is severe for most mountainside soils and moderate for basin soils. Soil erosion is greatest near roads along steep slopes, and intermittent stream channels, such as Emigrant Canyon and tributaries to Circle Creek. Erosion in these areas has formed deep gullies wherever the soil-binding vegetation has been disturbed. Some of the exposed soil banks are over 8 feet high with nearly vertical sides. Large clods of organic soil are common near the bottom of these soil banks. In heavily grazed areas, most of the protective vegetation ground cover is lacking and soil is exposed. In undisturbed areas of the reserve watershed vegetation effectively protects soil from the erosional forces of wind, precipitation, and runoff.

On a broader time frame, granular disintegration and erosion of the pluton have created a hollowed landscape within the mountain range, which pioneers traveling west on the California trail appropriately named "Circle Creek Basin." Pressure unloading-induced exfoliation has shaped a maze of grussic granitic and gneissic spires within the encircling basin, the bases of which are buried in coarse sand. Soil development is poor. Steep-sloped granitic terrains in arid and semi-arid climates are known for their *inability* to withstand land-use practices. At City of Rocks, cattle trails, social trails, dirt roads and undesigned campsites, all existing prior to establishment of the reserve, have disturbed the coarse-grained soils and diminished an already open cover of vegetation. Plant communities have substantially changed during the past 150 years due to various land-uses, agricultural and otherwise. Erosion, due to past and current land-uses, is a serious, accelerating, and difficult-to-reverse process affecting both cultural and natural resources. Streams have become locally entrenched, and sediment-choked elsewhere, diminishing riparian health and

impacting sections of the California Trail, hiking trails, and roads. Repairing eroded, and elsewhere buried, roads and trails is a recurring maintenance problem, which address only the symptoms.

Microbiotic soil

City of Rocks National Reserve is a classic shrub/steppe habitat that tends to be low in organic matter, low in available Phosphorous and Nitrogen, and often has limited available water. The importance of microbiotic soils in this type of ecosystem is their role in acquisition of nutrient resources. Presently, there needs to be an assessment on the impacts of management activities on these soils as well as identification of different soil characteristics as it relates to microbiotic conditions at various elevations throughout the park. These conditions may vary widely depending on previous grazing, harvest activities, as well as use by park visitors adjacent to camping facilities. It is important to also assess the role that microbiotic soils may play in maintaining the biodiversity of both the forb component and CAM plants that occupy higher elevations of the park, such as in the upper reaches of Indian Grove.

WATER RESOURCES

Surface water

Surface water in the reserve that flows to Goose Creek and Raft River is protected for use as agricultural water supply, cold water habitat, salmonid spawning, and primary and secondary contact recreation under Idaho water quality standards. Surface water in the reserve is used primarily for agricultural purposes. Water quantity and quality of the reserve streams and springs have not been extensively studied. Streamflows are reduced during the summer when water is diverted for agricultural purposes. The chemical components of the limited surface water quality data for the reserve are within criteria for designated uses.

Cattle concentrate in riparian areas and accelerate soil erosion and contribute fecal coliform to reserve streams and springs. Most of the soils in the reserve are

highly erodible, and several severely eroded areas contribute sediment to streams during high flows corresponding to storm events and spring snowmelt. High stream sediment and associated turbidity can negatively affect stream organisms both in and outside the reserve far downstream from the source of particulate matter.

Ground water

Little is known about the status of ground water in the reserve. The chemical components of well water tested in the reserve are within criteria for designated use. Ground water use outside the reserve combined with recent drought is thought to have decreased water flow to springs in the region. Such effects may be occurring but have not been documented within the reserve.

Water rights

The state of Idaho is currently conducting a water rights adjudication process for the Snake River basin, which includes City of Rocks. Under this process, all entities with water rights in the Snake River basin must file a water rights claim with the state. The purpose of the adjudication is to decide exactly how much Snake River water is currently allotted; where and how water is being used; and how much remains to be allotted. The National Park Service will file federal reserved and state appropriative water right claims for City of Rocks National Reserve for the Snake River basin adjudication.

Sufficient water for all wildlife, stock, and visitor needs may not be provided through the exercise of limited reserved water rights designated by Congress for this unit. Where reserved rights are insufficient, appropriative water rights will be required.

Floodplains (riparian areas)

Flooding occurs briefly, (however usually severe) about three times a year during heavy thundershowers from June through August. Spring melting also contributes to flooding of the major drainages of the reserve. Sediment from roads, trails and camping areas are inevitably washed into Circle Creek, resulting in heavy sediment loading and decreased water

quality. Due to the gneissic nature of the granitic terrain, erosion, to a degree, is natural, but development has caused erosion to go unchecked in many locations. Riparian areas have been impacted by gulchification on steeper gradients and sediment loading on low gradients, resulting in altered vegetative communities.

Mismanagement of certain agricultural uses, including livestock grazing, have had a major adverse impact on riparian vegetation and habitat in the reserve and are considered the major threat to these areas in the future.

Wetlands

Many small wetlands exist in the reserve, typically in riparian areas next to streams, springs and seeps. Because of the aridity of the region, these wetlands, although quite small, are important resources for many forms of life. No studies have been done to assess the condition of biotic and abiotic aquatic resources associated with wetlands.

VEGETATION

The current condition of the reserve's vegetation varies from healthy plant communities to complete loss. Some areas which have escaped impacts from vehicles, foot traffic, campsite development and cattle may appear healthy, but have become subjected to fire exclusion, pests and diseases. The most immediate threat to vegetation is compaction and erosion of soils around development zones. Of these areas, the Bath Rock parking vicinity, and selected campsites such as 12-20 are the most endangered.

Fire exclusion has led to the dominance of Basin Big Sagebrush in almost all areas where it occurs. Sagebrush density and cover exceeds 50% with some individuals exceeding a height of six feet. Fire exclusion has also altered the cultural landscape by permitting the expansion of the pinyon/ juniper forest to within 25 to 30 meters of the California Trail in some areas. Whereas historically this forest boundary was 200 to 300 meters from the trail route in those same areas.

Forest pests are threatening the health of the spruce-fir stands at Logger Springs and the north slope of the Granite Mountain ridge and must be dealt with in the next few years. Many of the aspen stands throughout the Albion Mountains appear to be in an unhealthy state, due to either drought, disease or fire exclusion.

Land practices prior to the designation of the reserve, such as development of recreational facilities and roads, and cattle grazing, have led to the introduction of exotic plants species. Although 63 non-native species are currently found within the reserve, fortunately only about a half dozen, black henbane, musk thistle, spotted knapweed, Canada thistle, white top, Dyers Woad, and Scotch Thistle, pose any immediate threat.

WILDLIFE

Since hunting is specifically permitted by public law within the reserve, City of Rocks faces little concern of wildlife overpopulation; however, in the absence of fire to control excessive vegetation cover, birds of prey may decrease in the reserve in search of more open habitat, which in turn can lead to overpopulation of prey such as snowshoe hare, mountain cottontail, golden-mantled chipmunk, and many other rodent species.

There are no immediate concerns of invasive non-native species, although feral house cats are becoming a concern in the adjacent community of Almo. Only the Rock Dove appears to have made the reserve a permanent home. Since there are no threatened or endangered species listed for the reserve, there is no present concern over this issue. In the absence of an official wildlife inventory and monitoring program, the current population levels of wildlife within the reserve can only be speculated. This in itself constitutes a threat to the conditions of wildlife. It remains unknown if development, visitor use, or cattle grazing has negatively affected certain wildlife species.

An ongoing mountain lion study conducted by John Laundre, from Idaho State University, can provide

valuable information in the management of this species; however since mountain lion hunting is permitted this information, when made public, may put the animal at an unfair advantage and should be considered a threat.

The most frequent threat to wildlife involves climber-raptor conflicts. Climbing routes adjacent to nesting sites of Red-tailed Hawks or other species occupying ledges are closed until nesting activity has ceased. It is important that all of these sites be discovered and closed prior to disturbance which causes the bird to abandon an active nest.

The reserve could play a role in the future of reestablishing extirpated species such as elk, prong-horn, and big-horn sheep; however, the success of any such program would rely entirely on the cooperation and initiation by the larger adjacent land managers such as the USFS, BLM and private ranchers.

INTEGRATED PEST MANAGEMENT

The semi-arid lands of south central Idaho have been particularly susceptible to the invasion and establishment of pest and noxious weeds and grasses. These non-native plants have invaded areas along roadsides and trails and other areas of the reserve where the soil has been disturbed. Federal law and policy mandates the control and eradication of noxious weeds on reserve lands. Of the 9,641 acres of reserve lands 6,220 acres are impacted by non-native plants. Of the 63 non-native plants, only two species pose serious threat at present: Musk Thistle and Black Henbane. In addition, Halogetin must be controlled because it is toxic to livestock. Manual and chemical control have been performed by Cassia County along county roads within the reserve. Some manual control has taken place by CIRO staff in 1996, but no official plan has been established.

Spruce-fir-lodgepole forest stands appear unhealthy and the regeneration of aspen stands is also a concern. The integrity of these stands must be evaluated, and steps taken to reverse the pests or diseases inflicting them. From appearances, it may take years

to return health to many stands. The lack of an IPM plan will, in time, become a threat to the protection of native plant resources and the birds and animals dependent upon them.

The activities of a few pests may affect the health and safety of visitors and employees. Yellowjackets, for example nest in and around recreation areas in high concentrations around garbage cans. While this yellowjacket species may be determined to be native, its concentrations at these locations have resulted in stings to both visitors and employees. Also, the reserve must be cognizant of the mouse population because of the potential threat of the disease hantavirus. An assessment, and plan of action is required to minimize these situations for the protection of visitors and employees. Reserve managers identify the development and implementation of an IPM plan for all of the reserve's pests as a high priority.

SUMMARY of NATURAL RESOURCE BASELINE INFORMATION

Meets, does not meet, or exceeds the recommended minimal set of natural resources information in Appendix A of NPS-75, the *Natural Resources Inventory and Monitoring Guideline*.

INVENTORY COMPONENTS	MEETS	DOES NOT MEET	EXCEEDS
Historical Database		x	
Prehistorical Database		x	
Species Information			
Species List		x	
Biological Surveys (Species Field Inventories)		x	
Species Distribution		x	
Fossil Species Information			
Species List		x	
Paleontological Surveys		x	
Species Distribution		x	
Vegetation Maps	x		
Cartographic Maps		x	
Soils Map	x		
Geology Map		x	
Water Resources Inventory	x		
Water Quality Data		x	
Air Quality Stations		x	
Air Quality Data		x	
Precip./Meteorological Data		x	

NATURAL RESOURCE MANAGEMENT ACTION PLANS CHECKLIST

The following list of natural resource management action plans were identified by the interdisciplinary planning team as necessary for premeditated resource stewardship at City of Rocks National Reserve.

TITLE	CURRENT AND APPROVED	INCOMPLETE; NEEDS REVISION OR UPDATING	NEEDED
Aspen Grove Management Plan			x
California Trail Management Plan			x
Climbing Management Plan	x		
Grazing Management Plan	x		
Hazardous Materials Management and Response Plan			x
Integrated Pest Management Plan			x
Interpretive Plan		x	
Land Protection Plan			x
Noxious Weed Monitoring Program			x
Research Natural Area Management Plan			x
Road Removal and Rehabilitation Plan			x
Sign Plan			x
Solid Waste Management Plan	x		
Trail System and Management Plan		x	
Vegetation Management Plan			x
Water Resources Management Plan/Monitoring Program			x
Wildland Fire Management Plan			x
Wildlife Management Plan			x

CULTURAL RESOURCE BASELINE INFORMATION

This section assesses the current status of baseline information for the reserve. City of Rocks has a varied and limited amount of current cultural resource-specific baseline information. Baseline information on cultural resources, both historic and prehistoric, within the reserve is minimal for all property types. Archeological sites are known to exist within the reserve, as are segments of the California Trail, Salt Lake Cutoff, and Boise-Kelton Road. Systematic surveys within and outside of the reserve have generally been project specific to address compliance needs.

The diversity of cultural resources generates a widespread need for inventories, documentation and studies. Cultural resources are grouped into six general categories: prehistoric and historic archeology, history, historic structures, natural and historic collections, cultural and historic landscapes, and anthropology. The disciplines of cultural anthropology, archeology, curation/conservation, historic architecture and historic landscapes all contribute to the research and technical knowledge necessary to understand and manage these resources.

PREHISTORIC & ARCHEOLOGICAL RESOURCES

Knowledge of archeological resources in the reserve is based on a survey conducted by David and Jennifer Chance and Associates in 1989. Some 65 sites (29 prehistoric, 23 historic, 13 having both prehistoric and historic components) were identified in and near the reserve. Of these sites, 25 were identified as being potentially eligible for nomination to the National Register. Among the prehistoric sites located were rockshelters (deep and slight overhangs and vertical walls), a hunting blind, a bedrock tray, and various scatter sites.

Archeological surveys and testing have been carried out at the reserve over the past four years to assess the

nature and extent of the reserve's archeological resources. An archeological overview summarizes current information about the reserve's archeological resources. The results of this effort and the surveys have been provided to the state historic preservation officer and will be used to develop a long-term strategy for archeological investigations. Preparation of this research design for the reserve will address both prehistoric and historic archeological sites and provide a plan for future survey work. A comprehensive reserve-wide survey, inventory, and assessment of archeological resources will evaluate their contextual significance, their eligibility, and their interpretive value.

HISTORIC RESOURCES

The City of Rocks has a long and rich human history that is manifested in the cultural resources which are extant in the reserve. These resources are diverse and are associated with a variety of historic themes including westward migration, exploration, settlement, recreation, and the administration of the area by the United States Forest Service, Bureau of Land Management and Idaho Department of Parks and Recreation. Understanding these themes and others which have yet to be studied is critical for identifying, documenting, registering, and managing significant cultural resources under the reserve's jurisdiction.

The most significant historical theme at City of Rocks, as identified by the Comprehensive Management Plan is the California Trail. The national significance of the California Trail was recognized by Public Law 102-328, approved August 3, 1992. This legislation designated the California National Historic Trail as a component of the national trails system. The 1968 National Trails System Act (Public Law 90-543), defined the purpose of the national historic trails as "the identification and protection of the historic route and its historic remnants and artifacts for public use and enjoyment."

The reserve has completed a historic resource study (1996) which identified and documented several significant themes. This study encompassed the areas

of archeology, ethnography, historic structures, and cultural landscapes. A cultural landscape inventory was conducted in 1994 to determine the significance of each of the ten sites inventoried. A California Trail rut inventory was completed in 1996 to define the trail and evaluate the remnants.

The natural land forms through the Albion, Raft River and Goose Creek mountain ranges create an instinctive migration route for all types of animals and humans *through* the mountains. This passageway is the only intramountain route through southern Idaho. The history of City of Rocks evolved from the people traveling these routes for various purposes. The granite towers marked the path and acted as a beacon to those on their way through City of Rocks. These formations are both naturally and culturally significant.

The major trails connecting east-west travel and converging at City of Rocks include: The California Trail, Salt Lake Cutoff, and Boise-Kelton Road. These trails routed thousands of people to different destinations.

The natural resources of the reserve attracted cultural interests. Plants attracted native aborigines for harvesting and several mining attempts to harvest mica, feldspar, gold and crude oil left behind machinery and tailings.

Structures, artifacts and other traces of human influence left behind are the cultural "fingerprint" of the region.

STRUCTURES

City of Rocks was once home to many families of various cultures. Shelters from native use can be found near a remnant homestead. The few remaining ruins of historic structures are a contributing part of the historic rural scene and help represent the historic continuum of the region's history. The visible remains of these most recent structures have been preserved through private ownership. Remains include a stone building at the original Tracy Homestead and several log buildings at the stage station/Moon Homestead. Three catch ponds and a series of ditches constructed on the Tracy Home-

stead are still used. Remnants of foundations and cellars can be found at the Mooso, Hansen, Fairchild and other locations. All of these are under private ownership.

The remains of the Vern White Mica Mine include two home foundations, pieces of machinery, open shafts and tailings. These are located on reserve lands.

COLLECTIONS

Since the creation of the reserve in 1988 the collections have grown through the archeological work David Chance and Associates and the plant study conducted by Thomas John. The collection of artifacts and mounted specimens are currently stored at other sites. During the time period of 1989-1994, collection management consisted of storing the objects in boxes or cabinets residing in the superintendents office of David Pugh at Twin Falls for those objects not formally belonging to a specific collection. When this office closed, January 1994, these boxes were moved to the visitor center in Almo. Museum cabinets were obtained from Ft. Vancouver National Historic Site, June 1994, and temporarily set up. During this period, nothing was formally accessioned. Several boxes of material still remain housed at the visitor center. The new version of the NPS-sponsored Automated National Cataloguing System (ANCS) is scheduled to arrive in spring (1997) and the items currently stored at the visitor center will be accessioned and cataloged.

Twenty-two boxes of uncataloged materials collected during archeological surveys are currently stored at Nez Perce National Historical Park. Also included are one-five gallon bucket of unprocessed soil samples, 1/3 linear foot of catalog work sheets and an artifact log of unknown number and condition.

More than 540+ mounted vascular plant specimens are stored at the Idaho State University Herbarium.

Special funding has been obtained (FY97) for the back cataloging of the mounted vascular plant specimens.

mens. A Scope of Collections Statement is currently in draft and a request for storage facilities made through DOI *Checklist for Preservation, Protection, and Documentation of Museum Property*.

A complete and well-preserved museum collection is a vital element of an effective resource management program. It is equally important for both cultural and natural resource management.

CULTURAL/HISTORIC LANDSCAPES

City of Rocks National Reserve contains a number of Nationally significant cultural landscape resources primarily related to the historic themes of western migration. These sites include pre-contact sites, roads and trails, historic mining landscapes, and sites with cultural values to other identifiable groups. In 1994, as part of a Service-wide cultural landscape inventory (CLI), ten individual sites were identified within the Reserve as potentially significant landscapes. While many of these sites have been evaluated, few of the landscape resources that also contribute to the historic scene have been inventoried or evaluated.

The CLI reflects the intrinsic strength of the interdisciplinary approach of cultural landscape research, which requires documenting and understanding both the biotic and cultural resources of a landscape. Evaluation of the significance of a cultural landscape may require drawing on ethnographic, archeological, historical and/or ecological data. The historic themes identified in the Historic Resource Study provide contexts for evaluating the individual sites and zones that have been identified in the reserve as potentially significant landscapes.

Cultural and visual resources identified as important are the national historic landmark, historic structures and sites, archeological sites, the historic rural setting, and foreground and middle ground of the views seen from the California Trail. Historic structures and sites associated with periods of history other than the California Trail are important because they provide information about other times, and about regional and local history. The importance of archeological sites stems

from the fact that they hold data about and artifacts from historic and prehistoric periods. Some of this material is of national significance. The historic rural setting is the spacious, open expanse resulting from the cumulative land uses beginning with the trail era and through the establishment of the reserve in 1988. Surviving resources associated with historic cattle ranching operations in the reserve contribute to a historic rural setting that imparts an increasingly rare ambience and scenic quality reminiscent of the American West. The foreground and middle ground of the views seen from the California Trail are relatively unchanged from the trail period and are an important part of the cultural landscape that assists visitors to envision and sense the California Trail setting and experience.

The cultural and visual resources identified as exceptional are historic structures, sites, and the "viewshed" of the California Trail (trail remnants, inscription rocks, other historic trail-related features, and the foreground and middle ground of the views seen from the trail). These nationally significant features led to the designation of the area as a national historic landmark.

City of Rocks was designated a national natural landmark in 1974 because it is a geologically unique area that exhibits nationally significant features and the unusual processes that formed them. The area covers a wide range of elevations over which the landforms are distributed, and evidence that the landforms have been carved from the upper parts of a pluton. The high scenic value of the distinctive geologic features has been a distinguishing characteristic of the area from early times as evidenced by the frequent reference to these features in emigrant journals.

The natural and visual resources identified as exceptional are major rock outcrops and associated enclosures that provide essential nesting and roosting sites for species of special concern and are of the highest scenic value and habitat for several rare and sensitive plants. The rock outcrops are exceptional because they contain multiple important resources. In addi-

tion to the geologic value of the rock outcrops themselves, the rocks provide habitat for special species and are important as scenic and recreational resources.

The Comprehensive Management Plan for City of Rocks identified several objectives and goals related specifically to preservation of the cultural landscape. As part of the establishing legislation to "protect and maintain scenic quality," the CMP identified and documented the following as the most important views and viewshed resources within and adjacent to the reserve:

Cultural/Visual Resources

Overlays of Important Resources

- National historic landmark boundary
- Historic structures and sites
- Archeological sites
- Foreground and middle ground of the views seen from the California Trail Historic rural setting and viewshed

Exceptional Resource Areas

- Historic structures, sites, and "viewshed" of the California Trail (trail remnants, inscription rocks, other historic trail-related features, and the foreground and middle ground of views seen from the trail)

Natural/Visual Resources

Overlays of Important Resources

- National natural landmark boundary
- Distinctive geologic features
- Potential habitat for state species of concern and for rare and sensitive plant species
- Essential habitat for the region's wildlife populations
- Wetlands
- Most-scenic views
- Most-frequently-seen views

Exceptional Resource Values

- major rock outcrops
- associated enclosures that provide essential

nesting and roosting sites for species of special concern and are of the highest scenic value and habitat for several rare and sensitive plants.

Because the area included inside the reserve boundary is the nucleus of a larger area with both national historic and national natural landmark designations, all the lands inside the reserve have one or more important resource values that also extend beyond the boundary of the reserve.

An inventory of cultural landscapes completed in 1994 defined the following ten sites as meriting additional documentation:

1. California Trail Corridor: Camp Areas
2. Nicholson Property (Stone House)
3. Inscription Rocks
4. Trail Creek Homestead & Mica Mine
5. Indian Grove
6. Heath Canyon Homestead
7. Pinnacle Pass
8. Stage Station
9. Emigrant Canyon
10. Sparks Property

Areas not included in this inventory are: Fairchild, Mooso, Hansen, Mikesell, Shoemaker and Jones. Permission was not granted by the private landowner to access sites at the time of the 1994 inventory.

Research needs to be conducted to identify the historical use of the landscape and its changes in the reserve. In March 1995, Utah State University, in cooperation with Cassia County, has developed a set of design guidelines for the historic zone

The Historic Resource Study (1996) identified significant historic themes, periods of development, historic land uses, and resources within the cultural landscape, providing a historic context for future research and study.

ETHNOGRAPHIC RESOURCES -

The Anthropological Study of Cultural and Natural Resources

To fit in with the Cultural Resource Management disciplines and resource types presented above, as well as the way in which funding is justified and obtained within the National Park System, the NPS has developed the concept of ethnographic resources. That concept constitutes an approach to making use of anthropological data derived from the study of past and present human populations in terms of categories of material or physical resources such as objects in collections, archeological sites, buildings and landscapes. The focus of anthropological studies, including but not limited to methods and theory in ethnography (descriptive anthropology) and ethnology (comparative anthropology), is to get information from people about the cultural and other values attached to natural and cultural resources located within areas such as the City of Rocks National Reserve.

A starting point for developing an anthropological perspective on resources within the reserve is to identify those people who have been or may continue to be concerned about resources in the reserve. Those people may be referred to as reserve-associated individuals and groups. Work with them may assist in the identification, management and preservation of resources within the reserve. Examples of "ethnographic resource types" include the following:

- Historical and contemporary subsistence uses and residency.
- Current ceremonial or religious uses of localities or certain resources by indigenous peoples, settlers or other identifiable groups.
- Traditionally used localities, geological formations, natural resources, sites and sacred objects.
- Ethnogeographic resources (place names used by various cultural groups).

- Traditional cultural properties (cultural resources defined with reference to potential eligibility for listing in the National Register of Historic Places; see National Register Bulletin 38).

In summary, ethnographic resources are intimately related to other categories of cultural resources, as well as to natural resources. With a focus on the human dimensions of resources, anthropological studies may provide a more complete understanding of resources and should, therefore, be coordinated with other inventory, evaluation and management programs whenever possible.

One way to develop an anthropological research program at the reserve, for example, would be to build upon existing preliminary data on connections between archeological resources and contemporary American Indian communities. A useful ethnohistorical study on the native inhabitants of City of Rocks and nearby areas exists, but it focuses on the period from 1820 to 1880 and does not discuss contemporary tribal groups (Chance 1989). Fortunately, two contemporary studies that will have some relevance to City of Rocks are currently underway. One is an ethnographic overview and assessment of southern Idaho, with a focus on the relationships between three contemporary tribes (the Shoshone-Paiute of the Duck Valley Reservation, the Shoshone-Bannock of the Fort Hall Reservation and the Northwestern Shoshoni) and the Snake River Valley. The other study consists of complementary oral history and ethnographic interviews. Both studies are being conducted by Dr. L. Daniel Myers and should be completed during the spring of 1997. At this point in time, much remains to be learned and documented about contemporary American Indian populations whose ancestors lived within the boundaries of the present-day reserve or about how the cultural and natural resources of the reserve might be of importance to contemporary tribal members.

PRESENT CONDITION of CULTURAL RESOURCES

OVERVIEW

In 1964 City of Rocks was designated a national historic landmark in recognition of its importance to the California Trail and the history of American westward overland emigration during the 1840s and 1850s. The national historic landmark boundaries only roughly coincide with the boundaries of the national reserve. Significant trail-related resources within the reserve include about 9 miles of the emigrant trail routes, including some of the best preserved segments of such trails in the nation, 13 "inscription rocks" on which the emigrants recorded their names and dates of passage on the granite, the principal encampment site along Circle Creek and the Twin Sisters landmark. The reserve's trail resources are greatly enhanced by the surrounding landscape, which still looks and feels much the same as it did when the emigrants passed through.

Prehistoric and historic archeological sites have been found in and near City of Rocks National Reserve. The geological and biological diversity of the City of Rocks area provided resources for early human subsistence. This section summarizes the condition and associated values of cultural resources described in the introduction and the threats to their existence.

PREHISTORIC & ARCHEOLOGICAL RESOURCES

Many of the sites are delicate and vulnerable to relic hunter depredations. Most of the sites have been picked over, damaged by relic collectors, obscured by natural depositions, or disturbed by farming and grazing operations. Identifying, recording and documenting these sites is imperative if the resources are to be preserved. Erosion and collection by visitors are two major threats to existing archeological sites. Because a comprehensive survey has not been conducted, additional significant sites likely remain unknown. Direction is needed for identifying, protecting, and managing prehistoric and historic archeological sites in the reserve.

HISTORIC RESOURCES

Visible remnants of American Indians, emigrants and various trails have been left behind. These remnants appear as rock shelters, chipping sites, campsites, axle grease inscriptions and trail scars. The California Trail remnants are some of the largest and best preserved in any National Park Service Unit. Historic journals and diaries document the human activity, and the vegetation and wild-life viewed during the journey.

The reserve was designated a National Historic Landmark (NHL) in 1964 because of its relationship to the California Trail and the history of American westward migration during the mid 1800s. The boundaries of the NHL extend beyond the boundaries of the established reserve. Within the reserve itself are about 9 miles of emigrant trail routes, including some of the best preserved segments of such trails in the nation. There are also potential resources related to early settlement and the subsequent development of agriculture/ranching activities which is still occurring today.

The reserve currently does not have any cultural resource specialists or expertise on staff to complete historical studies, determinations of eligibility, and nominations for the National Register of Historic Places.

STRUCTURES

The few remaining ruins of historic structures are a contributing part of the historic rural scene and help represent the historic continuum of the region's history. With the exception of the stage station, these ruins are not enclosed to prevent intrusion of cattle.

COLLECTIONS

As stated previously, the main collections are housed at other facilities. Those on-site collections are inadequately stored. There is not sufficient storage space for any expansion of the collection or to retrieve the collections from other facilities. It can be expected that future research projects identified in

this RMP will result in additions to the collection, however until action is taken museum storage will present problems.

CULTURAL/HISTORIC LANDSCAPES

Although the physical landscape remains much the same as it was historically, the present plant and animal communities are considerably different from those seen by the first emigrants -- a combination of historic and modern uses has resulted in successional shifts toward a dominance of sagebrush, pinyon pine, juniper, and non-native plants; riparian communities are no longer as prevalent near streams and springs, and a number of wildlife species have disappeared from the scene. Management to preserve natural processes and to restore more natural conditions to sites that have been disturbed by man's use would also enhance the historic scene that is important to the story of the California Trail.

The same characteristics of the landscape that make it valuable from a historical point of view also give it outstanding scenic quality. The variety of enclosed and expansive spaces, the rich mixture of colors and textures created by rocks and vegetation, the focal points and sense of direction provided by such distinctive landmarks as Twin Sisters, and the mystical qualities of this unusual place all contribute to a vividness that makes the City of Rocks a memorable scenic landscape.

The California Trail viewshed is known for its continuity and sequence; however, there are three important views and their viewsheds that warrant special attention. They are important because they are views experienced by travelers trying to find their way along the trail. These landmark views are:

- the view south towards Twin Sisters from the California Trail corridor as the ground rises from the basin north of Twin Sisters,
- the view northwest towards Twin Sisters along the Salt Lake Alternate Trail, and
- the view southwest to Granite Pass, from the southwest boundary of the reserve.

The first view has a barren foreground, with neither vegetation nor ground form to intercept a panoramic view of Twin Sisters ridge. The viewer is directed to the focal point of the highest two spires, but the spires' dominance is diminished by their nearly tandem orientation amongst the jumble of crags and peaks along Twin Sisters ridge and the lengthy distance of the scene from the other side of the basin. Yet, the view retains its significance by showing the trail alignment across the basin to Pinnacle Pass, one of the lowest points along the ridge.

The second view is the most dramatic view of the Twin Sisters. From this perspective, their adjacent posture stands above the rest of the ridge and against the sky. Sloping sagebrush-covered terrain in the foreground focuses the viewer's gaze upward. Although similar in form, this close viewing distance reveals their distinctive textures and coloring.

The third view is the most expansive and open vista of the three significant viewsheds experienced by historic travelers. Low-lying, uninterrupted vegetation creates a uniform ground texture extending from the foreground through the middle ground to the distant mountain forming the skyline. The mountain pass is a subtle notch in an otherwise relatively smooth ridgeline that can be viewed from the reserve boundary.

ETHNOGRAPHIC RESOURCES -

The Anthropological Study of Cultural and Natural Resources

Rather than constituting a separate type or class of resources, ethnographic resources are essentially pieces of information that may inform and expand on our existing knowledge about both natural and cultural resources. Information derived from either interviewing or observing people, for example, may complement and enrich what is already known about an historical archeological site, an artifact, an historical building, or a landscape.

SUMMARY of CULTURAL RESOURCE BASELINE INFORMATION

CULTURAL RESOURCE DOCUMENTATION CHECKLIST

Place an X in the appropriate column. Leave columns blank if document is not required for the park. Remember that items in the first section, PLANNING DOCUMENTS, may also apply to natural resources. See NPS-28, Chapter 2 for description of each inventory or study.

TITLE	CURRENT AND APPROVED	INCOMPLETE; NEEDS REVISION OR UPDATING	NEEDED
<u>PLANNING DOCUMENTS</u>			
Preauthorization and Authorization			
Statement for Management (SFM)	X		
Outline of Planning Requirements (OPR)			
Comprehensive Management Plan (CMP)	X		
Development Concept Plan (DCP)	X		
Resources Management Plan (RMP)	X		
Interpretive Plan (IP)		X	
<u>SERVICEWIDE INVENTORIES, LIST, CATALOGS AND REGISTERS</u>			
Cultural Resources Bibliography (CRBIB)			X
Cultural Sites Inventory			X
List of Classified Structures (LCS)			X

TITLE	CURRENT AND APPROVED	INCOMPLETE; NEEDS REVISION OR UPDATING	NEEDED
<u>SERVICEWIDE INVENTORIES, LIST, CATALOGS AND REGISTERS (CONT.)</u>			
National Catalog of Museum Objects			X
Cultural Landscapes Inventory (CLI)		X	
National Register of Historic Places		X	
<u>BASIC CULTURAL RESOURCE DOCUMENTS</u>			
Archeological Overview and Assessment			X
Archeological Identification Studies			X
Archeological Evaluation Studies			X
Rapid Ethnographic Assessment Procedures			X
Cultural Affiliation Study			X
Ethnographic Landscape Study			X
Ethnographic Overview and Assessment			X
Ethnographic Oral Histories & Life Histories			X
Ethnographic Program			X
Historic Resource Study	X		
Historical Base Map			X
Park Administrative History			X
Scope of Collection Statement		X	

TITLE	CURRENT AND APPROVED	INCOMPLETE; NEEDS REVISION OR UPDATING	NEEDED
<u>SPECIAL RESOURCE STUDIES & PLANS</u>			
Archeological & Ethno. Collections Studies			X
Archeological Data Recovery Studies			X
Collection Management Plan			X
Collection Storage Plan			X
Collection Condition Survey			X
Cultural Landscape Report (CLR)		X	
Ethnohistory			X
Exhibit Plan		X	
Historic Furnishing Report			X
Historic Structure Report			X
Inventory & Condition Assessment Program			X
Social Impact Study			X
Special History Study			X
Traditional Use Study			X
Other			X

SUMMARY CHART FOR STRUCTURES

Significance		Condition				Impacts				Documentation		
	Total	Good	Fair	Poor	unknown	Severe	Moderate	Low	unknown	Good	Fair	Poor
National	N/A											
Contributing	N/A											
State	N/A											
Local	N/A											
Not Significant	N/A											
Not Evaluated	N/A											
Totals	N/A											

SUMMARY CHART FOR ARCHEOLOGICAL SITES

Significance		Condition					Impacts				Documentation		
	Total	Good	Fair	Poor	Destroyed	unknown	Severe	Moderate	Low	unknown	Good	Fair	Poor
National	UNK					X				X			X
State and Regional	UNK					X				X			X
Local	UNK					X				X			X
Not Evaluated	UNK					X				X			X
Totals	UNK					X				X			X

SUMMARY CHART FOR ETHNOGRAPHIC RESOURCES

Resource Types		National Register	Authority	Non-Recreational Use	Documentation Level
Sites	UNK				
Structures	UNK				
Objects	UNK				
Natural Resources	UNK				
Ethnographic Landscapes	UNK				
Other	UNK				

SUMMARY CHART FOR CULTURAL LANDSCAPES

Significance		Condition				Impacts				Documentation		
	Total	Good	Fair	Poor	unknown	Severe	Moderate	Low	unknown	Good	Fair	Poor
National	UNK				X				X			X
State and Regional	UNK				X				X			X
Local	UNK				X				X			X
Not Evaluated	UNK				X				X			X
Totals	UNK				X				X			X

SUMMARY CHART FOR OBJECTS

Note: Obtain data from annual Collection Management Report (Form 10-94)

DOCUMENTATION Form 10-254 Submitted to National Catalog at Harpers Ferry	Archeology	Ethnology	History	Archives	Biology	Paleontology	Geology	TOTALS
Registration Data Only								0
Registration & Catalog Data								0
Total Items Cataloged								0
Backlog to be Cataloged								0
Total Collection Summary								0
CONDITION The percentage of collection in the following categories:	Archeology	Ethnology	History	Archives	Biology	Paleontology	Geology	
Excellent								
Good								
Fair								
Poor								
Unknown/NA	X	X	X	X	X	X	X	

CULTURAL CONTEXT and THEMES

The National Park Service's Thematic Framework was revised in June 1994. Under the revised framework, City of Rocks National Reserve's cultural resources fall under the following primary themes:

Peopling Places: This theme examines human population movement and change through prehistoric and historic times. Topics covered by this theme include family formation, patterns of daily life, migrations, interactions between groups, and the nature of communities. The archeological sites found within the reserve are examined and evaluated in terms of the information they may provide on prehistoric and historic lifeways. The California Trail segment and Salt Lake Alternate, and resources associated with historic settlement, farming, mining and ranching are all associated with this theme.

Transforming the Environment: This theme examines the variable and changing relationships between people and their environment, which continuously interact. Topics covered by this theme include manipulating the environment and its resources, adverse consequences and stresses on the environment, and protecting and preserving the environment. This theme acknowledges that the use and development of the physical setting is rooted in evolving perceptions and attitudes. The interplay between human activity and the environment is revealed in the historic emigrant trails through the City of Rocks, the journal accounts written by emigrants as they passed through, and in the farming and ranching life style that followed as the area was settled.

RESOURCE MANAGEMENT PROGRAMS

OVERVIEW OF CURRENT PROGRAM AND NEEDS

The cultural and natural resource management program is in its infancy. In June 1994, 12 resource management professionals and park managers convened at City of Rocks to initiate development of an integrated plan for managing the reserve's natural and cultural resources. This chapter and the following project statements are the embodiment of the program, and identify the preliminary actions toward implementation.

PERSONNEL

Protection of the reserve's natural and cultural resources is the responsibility of all of the reserve's staff. CIRO is directly administered and managed by the Idaho Department of Parks and Recreation (IDP&R), as stipulated by Congress in the establishing legislation. The IDP&R Park Manager, who also bears equal standing as an NPS park superintendent, provides direct oversight for the reserve's resource management program. There are two administrative support positions, Office Manager and Office Aid.

Protection and management of natural and cultural resources are the responsibility of the Assistant Park Manager. This position is equivalent to an NPS program area division chief, such as a Chief Ranger or Chief of Resources Management. Support personnel include three Park Rangers: Interpretive, Resource and Climbing.

Operation and Maintenance is implemented and supervised by a lead Ranger. Three support positions include a mechanic/craftsman, and two cleanup and maintenance staff.

Two seasonal park aid positions cover compliance and general work needs.

The amount of FTE devoted to resource management for the on-site staff described above is shown in Table 1.

Support for natural and cultural resources management is also provided by natural and cultural resource management specialists in the Columbia-Cascades Cluster's Support Office in Seattle, as required under Cooperative Agreement No. 1443-CA9000-96002 between the National Park Service and the State of Idaho Department of Parks and Recreation.

TABLE 1: RESOURCE PERSONNEL

(current year only)

12/20/96

FY: 1996
 Park: CIRO
 Cluster: CCC

TYPE OF EMPLOYEE *	FTEs of RESOURCES WORK		
	Natural	Cultural	Total
Research Scientists (0.0)	0.00	0.0	0.0
Resources Specialist (0.0)	0.00	0.00	0.00
Superintendent (1.0)	0.05	0.05	0.10
Assistant Manager (1.0)	0.35	0.05	0.40
Office Manager (0.8)	0.00	0.00	0.00
Office Aid (0.8)	0.00	0.05	0.05
Park Rangers Res Mgmt (1.0)	0.10	0.05	0.15
Park Rangers Res Interp (1.0)	0.00	0.30	0.30
Park Rangers Climbing (0.8)	0.30	0.05	0.35
Park Rangers Maintenance (3.75))	0.10	0.05	0.15
Total of RESOURCE Personnel	0.90	0.60	1.50
TOTAL RESERVE FTE: 10.15 PERCENT	11.27	16.92	6.76

* employees of Idaho State Department of Parks and Recreation

NATURAL RESOURCE PROGRAM

Funded Program

As is evident from the annual tables and programming sheets, deficiencies in funding and FTEs limit the resource management program. The funded natural resource program currently emphasizes the following:

- Survey and map distribution of non-native plants
- Develop and implement a non-native plant control program
- Develop and implement an Integrated Pest Management Plan

This level of support is severely inadequate to mitigate the resource impacts inherited by the NPS/ IDP&R when CIRO was established, and to address the continuing and prospective impacts incurred by increasing visitation.

Unfunded Program

Successful accomplishment and utility of results of many resource projects are dependent upon proper sequencing with other projects. Consequently, the highest priority projects focus on inventorying/ mapping and developing management programs to mitigate already known impacts to the reserve's resources. These preliminary resource projects cannot wait for adequate funding. Projects are frequently initiated, and sometimes completed, through the efforts of volunteers, graduate students, and park staff. The following are examples of projects completed without funding:

- vascular plant species were inventoried by a professional volunteer under the supervision of Idaho State University
- bird species were inventoried by volunteers, a local professor, and the assistant manager of the reserve

There are approximately 30 other projects that have been initiated without any funding. Timely completion of these projects is not anticipated due to insufficient

personnel and lack of commitment of funding. Unfunded projects can be classified into the following categories:

- Mitigation of exacerbating impacts due to land-use practices prior to establishment of the reserve
- Management of visitor uses, facilities, and NPS/ IDP&R activities to minimize impacts
- Documentation and protection of physical and biological resources, and natural processes
- Perpetuation of native wildlife species
- Control of non-native species
- Restoration of native plant communities and associated ecological processes
- Communicate with local government, property owners and permittees to pursue the management goals identified in the CMP
- Development of public awareness of the resource values and natural processes of the reserve

CULTURAL RESOURCE PROGRAM

The recommendations for each resource type reflect a consistent approach to managing cultural resources that is based on Section 110 of the National Preservation Act (as amended, 1992) and reflect federal laws and regulations, National Park Service Management Policies (Chap. VI), and NPS-28: Guideline for Cultural Resources Management. The major components of this management approach follow a standard logical sequence of actions: inventory (identify), evaluate (understand), and protect (manage). All completed and recommended documents and actions relate to one of these three components. The highest priorities for cultural resource management will be the stabilization and protection of known resources and the expansion of cultural resource data to support research and management needs.

Prehistoric, Archeological and Historic Resources

The cultural resources at City of Rocks can be divided into six categories based on the prehistorical and historical periods/eras of the area: (1) pre-California Trail; (2) California Trail; (3) Boise-Kelton Road; (4) homesteading; (5) ranching; and (6) recreation.

Funded

General studies that have encompassed all of these eras include a brief annotated bibliography completed by Jennifer Attenberry and the preliminary cultural landscape reports (1994). A historic resource study was completed in 1996 by HRA, which included the National Register nomination of a historic district. A study by David Chance and Associates (1990) documents some of the resources affiliated with the prehistory, California Trail, Boise-Kelton Road and homesteading eras. Through the work of Idaho State University, the California Trail has been inventoried and documented on current reserve lands and lands where permission was granted. Research conducted by Bill Little documented aspects of the cattle-sheep industry including the pre-history and homesteading periods. During FY1997 the documentation of the historic inscriptions on the register rocks will begin.

This document addresses the need for baseline surveys for prehistoric and historic resources.

Unfunded

All of the known cultural resource areas of the reserve have not been surveyed or documented owing in part to the ownership of private land. Where permission has been granted the areas have been preliminarily documented. It is recommended that the reserve promote an ongoing professional historical research program through cooperation with the Columbia-Cascades Support Office cultural resources staff. This program will ensure that planning documents and other needed studies are completed. In addition, this program will:

- provide information needed to identify additional historic themes relevant to the reserve's history
- identify, document, evaluate, and register significant cultural resources worthy of preservation

- provide the documentation/research materials to make informed decisions about how to best manage significant resources according to NPS policies

This research program will consist of historical studies that expand upon themes identified in the Historic Resource Study (1996) and other documents, as well as themes as yet unidentified.

Unfunded needs include the documentation and research of the American Indians and all project statements dealing with the ethnographical and anthropological of this user group. The focus of studies of the pre-California Trail era would be studies of the American Indians use of the reserve, their culture, and religious beliefs. Additional research would focus on exploration/use of the area by trappers.

California Trail needs include additional documentation of the resources of the trail, (including recording trail segments in GIS format), the stabilization and protection of the trail, protection of the view sheds and cultural landscapes, and the interpretation of the history of trail users.

Documentation and survey of the stage station area and the owners is necessary to understand the relationship of the stage to the reserve.

All projects dealing with the documentation and survey of homesteading and mining sites must occur before all traces are gone. Several people are still living who call the City of Rocks home. Oral histories need to be obtained before these resources are lost forever. The protection of these sites and the safety of visitors to these sites are a high priority.

Cultural/Historic Landscapes

Funded

A preliminary Cultural Landscape Report was completed in 1994.

Unfunded

Without a comprehensive inventory and assessment of cultural landscapes, management decisions may be made without a full understanding of the value or key

features associated with these resources. A comprehensive inventory of cultural landscapes is needed to identify, evaluate, assess condition, and identify threats and management requirements for cultural landscapes throughout the reserve. All significant landscapes should be evaluated and listed in the National Register, to assure compliance and management responsibilities are met. Where the National register documentation already exists for the site, amendments will need to be compiled so all resources are identified.

Management guidelines and recommendations for treatment of cultural landscapes must be developed and implemented to assure the long term preservation and compliance with federal laws and regulations. Treatment plans are typically developed as part of a cultural landscape report, and are needed to address the interrelationships and potential conflicts between cultural landscapes and natural resources, historic structures, archeological resources, and ethnographic resources. General management requirements for significant cultural landscapes will be documented in the Cultural Landscape Inventory, while more detailed recommendations for treatment will be documented as part of a cultural landscape report for individual sites as needed, or as part of a general CLR for the cultural landscape as a whole.

Ethnography/Anthropology

Unfunded

The primary goals of the proposed anthropology program are:

- The facilitation of relationships between the reserve and reserve-associated groups as a foundation for compliance with consultation requirements of law and policy.
- The use of anthropology and anthropologists to provide data from ethnography (descriptive anthropology) and ethnology (comparative anthropology) to meet the growing needs and obligations of the reserve managers and staff.
- To complement the work of other resource specialists so that reserve management has the information needed to make well-informed decisions.

TABLE 2: FUNDING - 1997

02/04/97
07:59:59

FUNDED TABLE
CULTURAL/INTEGRATED/NATURAL
FUNDED AMOUNTS
(\$ in thousands - by activity type)

FY: 1997
Park: CIRO
Cluster: CCSO

FUNDING SOURCE	TOTAL	RES	MIT	MON	PRO	INT	ADM
NOTH	2.00	0.00	2.00	0.00	0.00	0.00	0.00
PNR1	5.00	0.00	5.00	0.00	0.00	0.00	0.00
SNRP	5.00	5.00	0.00	0.00	0.00	0.00	0.00
TOTAL	12.00	5.00	7.00	0.00	0.00	0.00	0.00

TABLE 3: UNFUNDED - 199702/04/97
08:05:20

UNFUNDED TABLE
CULTURAL
 UNFUNDED AMOUNTS
 (\$ in thousands - by funding type)

FY: 1997
 Park: CIRO
 Cluster: CCSO

FUNDING TYPE	TOTAL	RES	MIT	MON	PRO	INT	ADM
One-time	245.00	245.00	0.00	0.00	0.00	0.00	0.00
Recurring	150.00	150.00	0.00	0.00	0.00	0.00	0.00
TOTAL	395.00	395.00	0.00	0.00	0.00	0.00	0.00

02/04/97
08:05:58

UNFUNDED TABLE
INTEGRATED
 UNFUNDED AMOUNTS
 (\$ in thousands - by funding type)

FY: 1997
 Park: CIRO
 Cluster: CCSO

FUNDING TYPE	TOTAL	RES	MIT	MON	PRO	INT	ADM
Cyclic	5.00	0.00	0.00	0.00	0.00	0.00	5.00
One-time	66.00	35.00	0.00	30.00	0.00	0.00	1.00
Recurring	95.50	50.00	40.00	5.00	0.00	0.00	0.00
TOTAL	166.00	85.00	40.00	35.00	0.00	0.00	6.00

02/04/97
08:06:33

UNFUNDED TABLE
NATURAL
 UNFUNDED AMOUNTS
 (\$ in thousands - by funding type)

FY: 1997
 Park: CIRO
 Cluster: CCSO

FUNDING TYPE	TOTAL	RES	MIT	MON	PRO	INT	ADM
One-time	167.51	154.00	0.00	7.71	3.60	1.20	1.00
Recurring	49.00	8.00	18.50	9.50	0.00	0.00	13.00
TOTAL	216.51	162.00	18.50	17.21	3.60	1.20	14.00

PROGRAMMING SHEET 1: FUNDED ACTIVITIES

02/04/97
08:07:27

PROGRAMMING SHEET 1
CULTURAL
FUNDED ACTIVITIES
(\$ in thousands)

FY: 1997
Park: CRO
Cluster: CCSO

PROJECT NUMBER	PROJECT TITLE	PKG NUM	CULT RES TYPE	SYSTEM- WIDE ISSUE	FUNDING SOURCE	ACT TYP	T Y P	CURRENT YEAR 1997 \$ FTE	OUTYEAR 1 1998 \$ FTE	OUTYEAR 2 1999 \$ FTE	OUTYEAR 3 2000 \$ FTE	TOTAL \$ FTE
0 projects printed												

02/04/97
08:08:04

PROGRAMMING SHEET 1
INTEGRATED
FUNDED ACTIVITIES
(\$ in thousands)

FY:1997
Park: CRO
Cluster: CCSO

PROJECT NUMBER	PROJECT TITLE	PKG NUM	CULT RES TYPE	SYSTEM- WIDE ISSUE	FUNDING SOURCE	ACT TYP	T Y P	CURRENT YEAR 1997 \$ FTE	OUTYEAR 1 1998 \$ FTE	OUTYEAR 2 1999 \$ FTE	OUTYEAR 3 2000 \$ FTE	TOTAL \$ FTE
0 projects printed												

02/04/97
08:08:04

PROGRAMMING SHEET 1

NATURAL

FUNDED ACTIVITIES

(\$ in thousands)

FY: 1997
Park: CIRO
Cluster: CCSO

PROJECT NUMBER	PROJECT TITLE	PKG NUM	CULT RES TYPE	SYSTEM- WIDE ISSUE	FUNDING SOURCE	ACT TYP	T Y P	CURRENT YEAR 1997	OUTYEAR 1 1998	OUTYEAR 2 1999	OUTYEAR 3 2000	TOTAL	
								\$\$	FTE	\$\$	FTE	\$\$	FTE
N620.000	SURVEY AND MAP DISTRIBUTION OF NON-NATIVE PLANTS		COMB	N05 N20	NRPP	RES	O	5.00	0.04	.00	.00	5.00	0.04
N621.000	DEV/IMPL NON-NA- TIVE PLANT CON- TROL PROGRAM		COMB	N05 N08	PKBASE-NR	MIT	R	2.00	0.06	2.00	0.06	8.00	0.24
N740.000	DEVELOP AND IM- PLEMENT AN IPM PLAN		CULL	N05 C18	PKBASE-NR NON-NPS-O Subtotal	MIT MIT	R R	3.00 2.00 5.00	0.06 0.04 0.10	3.00 .00 3.00	0.06 .00 0.60	12.00 2.00 14.00	0.24 0.04 0.28
Grand Total								12.00	0.20	5.00	0.12	27.00	0.56
Grand Total													
3 projects printed													

PROGRAMMING SHEET 2: UNFUNDED ACTIVITIES

02/04/97
08:09:41

PROGRAMMING SHEET 2

CULTURAL

UNFUNDED ACTIVITIES

(\$ in thousands)

FY: 1997

Park: CIRO

Cluster: CCSO

PK PRI	PROJECT NUMBER	PROJECT TITLE	PKG NUM	CULT RES TYPE	SYSTEM- WIDE ISSUE	ACT TYP	T Y P	CURRENT YEAR 1997	OUTYEAR 1 1998	OUTYEAR 2 1999	OUTYEAR 3 2000	TOTAL
								\$\$ FTE	\$\$ FTE	\$\$ FTE	\$\$ FTE	\$\$ FTE
3	C123.000	CONDUCT ORAL HISTORY PROJECTS		ETHN	C27	RES	R	50.00 1.00	.00 .00	.00 .00	.00 .00	50.00 1.00
6	C150.000	COMPLETE ARCHEOLOGICAL INVENT/DOC REMNANTS CA TRAIL		SITE	C03	RES	R	50.00 1.50	50.00 1.50	50.00 1.50	.00 .00	150.00 4.50
4	C152.000	DOCUMENT HISTORIC IN- SCRIPTIONS		ETHN	C26 C72	RES	O	50.00 1.00	.00 .00	.00 .00	.00 .00	50.00 1.00
8	C153.000	DOCUMENT HISTORIC MIN- ING SITES			C12 C57	RES	O	75.00 1.50	.00 .00	.00 .00	.00 .00	75.00 1.50
9	C154.000	LOCATE AND DOCUMENT HISTORIC HOMESTEAD SITES		SITE	C02 C03	RES	R	50.00 1.00	25.00 0.50	.00 .00	.00 .00	75.00 1.50
2	C155.000	PROVIDE MAPS OF ARCHEO/HIST SITES ALREADY SURVEYED		SITE	C04	RES	O	20.00 0.50	.00 .00	.00 .00	.00 .00	20.00 .050
10	C300.000	COMPLETE CULTURAL LANDSCAPE INVENTORY		CULL	C10	RES	O	100.00 1.50	.00 .00	.00 .00	.00 .00	100.00 1.50
7 projects printed								395.00 8.00	75.00 2.00	50.00 1.50	0.00 0.00	520.00 11.50
Grand Total								395.00 8.00	75.00 2.00	50.00 1.50	0.00 0.00	520.00 11.50
Grand Total								395.00 8.00	75.00 2.00	50.00 1.50	0.00 0.00	520.00 11.50

02/04/97
08:10:17

PROGRAMMING SHEET 2

INTEGRATED

UNFUNDED ACTIVITIES

(\$ in thousands)

FY: 1997
Park: CIRO
Cluster: CCSO

PK PRI	PROJECT NUMBER	PROJECT TITLE	PKG NUM	CULT RES TYPE	SYSTEM- WIDE ISSUE	ACT TYP	T Y P	CURRENT YEAR 1997 FTE	OUTYEAR 1 1998 FTE	OUTYEAR 2 1999 FTE	OUTYEAR 3 2000 FTE	TOTAL FTE
								\$\$	\$\$	\$\$	\$\$	\$\$
1	1080.000	DEVELOP AND MAINTAIN GEOGRAPHIC INFORMATION SYSTEM			C62	MON	O	30.00 0.25	30.00 0.25	.00 0.00	.00 0.00	60.00 0.50
					Subtotal	MON	R	5.00 0.10	5.00 0.10	5.00 0.10	5.00 0.10	20.00 0.40
7	1333.000	DEV/IMPL CA TRAIL MGMT PLAN W/ MONITORING		CULL	C11	RES	R	50.00 1.00	100.00 2.00	100.00 2.00	.00 0.00	250.00 5.00
2	1810.001	DEV AND IMPL ROCK CLIMBING MGMT PLAN; INTV CLIMBING ROUTES			N18	ADM RES MON	O O C	1.00 1.00 0.00	.00 0.00 0.40	.00 0.00 0.40	.00 0.00 0.00	1.00 1.00 0.80
					Subtotal			31.00 1.10	15.00 0.40	15.00 0.40	.00 0.00	61.00 1.90
4	1822.000	ASSESS RESOURCE CONDI- TIONS OF CAMPGROUNDS			N22 N06	RES	O	5.00 0.10	.00 0.00	.00 0.00	.00 0.00	5.00 0.10
5	1823.000	DEV AND IMPL A TRAIL MGMT PLAN		CULL	N24	ADM MIT	C R	5.00 40.00	.00 40.00	.00 40.00	.00 40.00	5.00 160.00
					Subtotal			45.00 1.80	40.00 1.50	40.00 1.50	40.00 1.50	165.00 6.30
999	1840.000	RESEARCH AND DEVELOP A GRAZING MGMT PLAN		CULL	C70 N04	PRO	O	.00 0.00	.00 0.00	.00 0.30	.00 0.00	0.30 0.30
8	1884.000	DEVELOP A HAZARDOUS MATERIALS MGMT / RE- SPONSE PLAN			C70	PRO	R	.00 0.00	.00 0.50	0.10 0.10	.00 0.00	0.50 0.10
7 projects printed					Grand Total	\$\$		166.00	190.00	160.50	45.00	561.50
					Grand Total	FTE		4.35	4.25	4.40	1.60	14.60

3	N740.000	DEV AND IMPL AN IPM PLAN	CULL	N05 C18	ADM RES MIT	R	1.00 25.00 0.00	0.02 0.50 0.00	1.00 0.00 10.00	0.02 0.00 0.25	1.00 0.00 10.00	0.02 0.00 0.25	1.00 0.00 10.00	0.02 0.00 0.25	4.00 25.00 30.00	0.08 0.50 0.75
				Subtotal			26.00	0.52	11.00	0.27	11.00	0.27	11.00	0.27	59.00	1.33
999	N830.000	MONITOR AND EVALUATE HUNTING WITHIN THE RE- SERVE		N18 N19	RES	O	7.00	0.40	0.00	0.00	0.00	0.00	0.00	0.00	7.00	0.40
9	N850.000	DEVELOP A LAND PROTEC- TION PLAN		N06 N24	RES MON	O R	10.00 0.00	0.20 0.00	0.00 0.00	0.00 0.20	0.00 0.00	0.00 0.20	0.00 0.20	0.00 0.20	10.00 0.00	0.20 0.60
				Subtotal			10.00	0.20	0.00	0.20	0.00	0.20	0.20	0.20	10.00	0.80
22 projects printed				Grand Total	\$\$		216.51	4.47	84.50	1.93	75.00	1.57	47.00	1.37	423.01	9.34
				Grand Total	FTE											

PROJECT PRIORITIES

The substance of the resource management program is the projects described in this section. Several projects needs have been identified for City of Rocks. Since it will take several years to acquire funding to implement most of these projects, only those that have been identified as high priority needs have been written at this time. Remaining project statements, and new additions, will be written as they are prioritized, and added to the RMP during annual updates. Each written project statement describes the nature of a resource issue or problem, a brief proposal on how to address and/or resolve the issue, and personnel and funding needs to implement the project. Project statement titles are presented below in priority order. Priorities are established based on the following criteria:

- Management issues mandated by law
- Health and Safety
- Resource protection
 - Severity of impact: extent, intensity, reversibility
 - Manageability of impact: Is it feasible, or even possible, to reduce or mitigate the impact?
 - Imminence

Prioritized List of Natural Resource Project Statements

- 1 N-440.000 Produce a suite of geologic resource maps
 - N-440.001 Field Check Unpublished Bedrock Geologic Map (incorporate into GIS)
 - N-440.002 Map Quaternary geology (incorporate into GIS-database)
 - N-440.003 Map Landforms
 - N-440.004 Inventory Fragile Rock Formations
 - N-440.005 Produce Terrain Analysis Map
 - N-440.006 Train Reserve Staff
- 2 N-700.000 Develop a Wildland Fire Management Plan
 - N-700.001 Research and map fire history
 - N-700.002 Inventory and map fuel loads
 - N-700.003 Research fire effects as it relates to vegetative response and biochemical cycles
 - N-700.004 Manage to restore ecosystem and achieve cultural landscape objectives, for mosaics of seral vegetation and biodiversity
- 3 N-740.000 Develop and implement an Integrated Pest Management Plan
- 4 N-600.000 Develop a vascular plant species collection
 - N-600.001 Complete a vascular plant species list
 - N-600.002 Purchase herbarium equipment
 - N-600.003 Train reserve staff
- 5 N-620.000 Survey and map distribution of non-native plant species
- 6 N-621.000 Develop and implement non-native plant program
- 7 N-640.000 Conduct biological assessment of forest communities
- 8 N-660.007 Survey and monitor raptor distribution and population
- 9 N-850.000 Develop a Land Protection Plan
- 10 N-420.000 Monitor weather on an elevation gradient

Prioritized List of Cultural Resource Project Statements

- 1 C-120.000 Complete a Historic Resources Study
- 2 C-155.000 Provide maps of archeological/historical sites already surveyed
- 3 C-123.000 Conduct oral history projects
- 4 C-152.000 Document historical inscriptions
- 5 C-250.000 Prepare Scope of Collections Statement
- 6 C-150.000 Complete archeological inventory
- 7 C-201.000 Conduct cultural affiliations study
- 8 C-153.000 Document historic mining sites
- 9 C-154.000 Locate and document historic homestead sites
- 10 C-300.000 Complete cultural landscapes inventory
- 11 C-251.000 Catalog museum collections
- 12 C-101.000 Develop cultural sites inventory
- 13 C-282.000 Purchase museum and storage and security equipment
- 14 C-200.000 Conduct ethnographic overview and assessment
- 15 C-151.000 Evaluate archeological resources & prepare National Register Nomination for significant sites

Prioritized List of Integrated Project Statements

- 1 I-080.000 Develop and maintain geographic information system
- 2 I-810.000 Develop and implement a Rock Climbing Management Plan
 - I-810.001 Inventory climbing routes
 - I-810.002 Document current impact due to human activity
 - I-810.003 Design and implement program to monitor and evaluate climbing-use levels
 - I-810.004 Develop climbing management policies and guidelines
 - I-810.005 Manage rock climbing to control impacts
- 3 I-820.000 Inventory and map current trails
- 4 I-822.000 Assess resource condition of campgrounds
- 5 I-823.000 Develop and implement a comprehensive trails system and management plan
- 6 I-451.000 Control soil erosion and sedimentation
- 7 I-333.000 Develop/implement CA Trail Management Plan, with follow-up monitoring
 - I-333.001 Define critical cultural resource elements in California Trail corridor
 - I-333.002 Identify important related features/elements outside the ½-mile corridor
 - I-333.003 Carry out resource inventories
 - I-333.004 Rehabilitate eroded areas as appropriate
 - I-333.005 Manage vegetation as appropriate
 - I-333.006 Develop design guidelines for acceptable structures
 - I-333.007 Restore vegetation characteristics of the California Trail period
- 8 I-884.000 Develop a Hazardous Materials Management and Response Plan
- 9 I-182.000 Stabilize remnants/ruts of California Trail
- 10 I-280.000 Develop Collections Management Plan

PROJECT STATEMENTS

This section contains the project statements, or descriptions, for the top ten prioritized project titles listed in the previous section, as well as some of the other project needs identified in the list of resource management project statements in the table of contents. Not all project statements have been written at this time, partly due to the dependent nature of some projects on the outcome of other projects, and partly due to the long-range focus of identified resource management needs. Identified unwritten projects, as well as future identified issues, will be written as needed and appended to this plan during the annual updates.

Project Statement
Last Update: 11/22/96
Initial Proposal: 1994

CIRO-C-120.000
Priority: 12

Title: COMPLETE A HISTORIC RESOURCES STUDY

Funding Status: Funded: 0.00 Unfunded: 0.00

Servicewide Issues : C35 (HRS)
 C10 (INVENTORY)
Cultural Resource Type: COMB (Combination)
N-RMAP Program codes :

10-238 Package Number :

Problem Statement

City of Rocks National Reserve was authorized by Congress in November, 1988, " in order to preserve and protect the significant historical and cultural resources, to manage recreational use; to protect and maintain scenic quality; and to interpret the nationally significant values of the reserve." The reserve, while a non-traditional unit of the National Park system, is a fully recognized unit all the same. Under Section 110 of the National Historic Preservation Act of 1966 (as amended in 1980, 1992), all federal agencies are required to identify, document, register and manage significant cultural resources under their jurisdiction. While the significant resources in the reserve have been identified, there is no adequate, in-depth study or comprehensive history that chronicles the human history of the reserve in which these resources appear.

A Historic Resource Study would consolidate and summarize the various primary and secondary source materials available on the reserve and provide a historic base map identifying significant resources, a bibliography, and National Register nomination forms for all eligible resources. More importantly, an HRS would identify the significant historic themes or contexts for the reserve. This information would lead to better protection of and enhanced interpretation for the reserve's resources. A complete documentation that identifies the significant historic themes, events, and activities important in reserve history is a critical first step in order to identify, evaluate and register significant cultural resources. These resources include historic sites, structures, and landscapes.

Description of Recommended Project or Activity

This project will be accomplished in phases. Phase I will provide a comprehensive account of the human history of the area and discuss the unit's known cultural resources and their related historic themes within a framework of historic context statements. Phase II will identify and evaluate National Register eligible properties. The extant cultural resources located within CIRO shall be identified, mapped, evaluated and nominated (as appropriate) to the National Register of Historic places, as required by NPS-28, Cultural Resources Management Guidelines and Section 110 of the National Historic Preservation Act of 1966, as amended.

BUDGET AND FTEs:

-----FUNDED-----				
Source	Activity	Fund Type	Budget (\$1000s)	FTEs
			=====	=====
Total:			0.00	0.00
-----UNFUNDED-----				
	Activity	Fund Type	Budget (\$1000s)	FTEs
			=====	=====
Total:			0.00	0.00

(Optional) Alternative Actions/Solutions and Impacts
(No information provided)

Compliance codes: EXCL (CATEGORICAL EXCLUSION)

Explanation: 516 DM6 APP. 7.4 B

Project Statement
Last Update: 08/13/96
Initial Proposal: 1994

CIRO-C-123.000
Priority: 999

Title: **CONDUCT ORAL HISTORY PROJECTS**

Funding Status: Funded: 0.00 Unfunded: 50.00

Servicewide Issues : C27 (ORAL HIST)
Cultural Resource Type: ETHN (Ethnographic Resources)
N-RMAP Program codes :

10-238 Package Number :

Problem Statement

The reserve is losing significant sources for oral histories as long-time residents pass away. Oral histories are an important source of historical information covering diverse topics. This is particularly true if an area does not have a strong written historical record. Oral histories provide personal, interesting insights into people, events, activities, and traditions important to an area. Much of the history associated with the resources in City of Rocks National Reserve is not recorded in one document or study. CIRO lacks this basic documentation, and oral histories are a means of acquiring this material. The reserve has a large number of individuals who have lived and worked in the area for decades and who could provide information not recorded elsewhere.

Description of Recommended Project or Activity

Initiating an oral history program in the reserve would include: 1) researching members of the community and identify those individuals who would contribute important historical information about the reserve, its history, and its resources; 2) preparing questions relevant to the individual's background and conduct a professional recorded oral history interview; 3) taking photographs of the individual being interviewed and any interesting materials they may have (such as artifacts, tools, etc., particularly if they discuss it in their taped interview); and 4) transcribing the oral history tapes and establish an archives or library of the manuscripts for easy access by researchers or interested members of the community. This is an ongoing project, as different members of the community, young and old, have different kinds of information to offer such a program. This work can be conducted by volunteers, students, or by contractors.

No action would result in a lack of accurate baseline documentation about the history and resources of the reserve. Older residents will continue to pass away without important information about the reserve being recorded.

BUDGET AND FTEs:

-----FUNDED-----				
Source	Activity	Fund Type	Budget (\$1000s)	FTEs
Total:			0.00	0.00
-----UNFUNDED-----				
	Activity	Fund Type	Budget (\$1000s)	FTEs
Year 1:	RES	Recurring	50.00	1.50
Year 2:	RES	Recurring	50.00	1.50
Year 3:	RES	Recurring	50.00	1.50
Total:			150.00	4.50

(Optional) Alternative Actions/Solutions and Impacts
(No information provided)

Compliance codes: ARPA (ARCH. RES. PROT. ACT.)

Explanation:

Project Statement
Last Update: 11/22/96
Initial Proposal: 1994

CIRO-C-152.000
Priority: 15

Title: **DOCUMENT HISTORIC INSCRIPTIONS**

Funding Status: Funded: 0.00 Unfunded: 50.00

Servicewide Issues : C26 (ETHNOHIST)
 C72 (PROTECTION)
Cultural Resource Type: ETHN (Ethnographic Resources)
N-RMAP Program codes :

10-238 Package Number :

Problem Statement

The historic inscriptions and messages left by the passing travelers of the California National Historic Trail and other related trails are being lost through the forces of nature. As each year goes by weathering, natural forces and sometimes vandalism continues to erode more and more of the signatures and inscriptions away. If this project is not completed in the very near future, the cultural resource will be lost. There is no known documentation of all of the inscriptions in the reserve. Completion of the project would insure proper protection and management and assist in the interpretation of the reserve.

Description of Recommended Project or Activity

This project would inventory, evaluate, document, research and stabilize one of the chief cultural resources at City of Rocks. The project would include the locating and mapping of all know rocks with inscriptions; recording and photographing all visible names, message and dates; storing all of the above information and publishing the findings. This project would be accomplished by a graduate student in history or archeology under the direction of a qualified professor or under contract.

BUDGET and FTEs: 1 FTE 50,000

BUDGET and FTE: 1 FTE/yr. 50,000. Five years to complete.

BUDGET AND FTEs:

-----FUNDED-----				
Source	Activity	Fund Type	Budget (\$1000s)	FTEs
Total:			0.00	0.00
-----UNFUNDED-----				
	Activity	Fund Type	Budget (\$1000s)	FTEs
Year 1:	RES	Recurring	50.00	1.00
Total:			50.00	1.00

(Optional) Alternative Actions/Solutions and Impacts
(No information provided)

Compliance codes: EXCL (CATEGORICAL EXCLUSION)

Explanation: 516 DM2 APP. 2, 1.11

Project Statement
Last Update: 01/31/97
Initial Proposal: 1994

CIRO-C-150.000
Priority: 3

Title: **COMPLETE ARCHEOLOGICAL INVENT/DOC REMNANTS CA TRAIL**

Funding Status: Funded: 0.00 Unfunded: 150.00

Servicewide Issues : C03 (SITE DOC)
Cultural Resource Type: SITE (Archeological Site)
N-RMAP Program codes :

10-238 Package Number :

Problem Statement

The reserve currently lacks data on the cultural properties it administers. An archeological inventory would assist management by recording the locations, significance, threats, and management requirements for all known and potential archeological sites in order to guide their management and preservation.

Description of Recommended Project or Activity

This project will help meet compliance with mandates such as Section 106 of the National Historic Preservation Act and identification and protection of archeological resources. There is an urgent need to know more about site distributions in the reserve, based on a more representative sample of the reserve's archeological resources. A model needs to be developed for historic land use that accounts for changes through time in variables such as resource distributions and availability, subsistence technology, settlement patterns, and social organization, and to structure the field work to test this model using techniques that account for the difficulties in discovering archeological sites. The inventory will include records of existing inventories of surface features and artifacts, base maps and bibliographies of previous surveys. It will show exiting levels of survey coverage and areas needing further work. It will cross-reference with state archeological site reports, the list of classified structures, cultural resources management bibliography, National Register of Historic Places, and Historic American Engineering Record. The most efficient approach would be to conduct systematic surveys according to thematic groups until most or all such properties are recorded. This would require archival research to locate potential properties, and field visits to record any remains present.

Year 1 1.5 FTE \$50,000
Year 2 1.5 FTE \$50,000
Year 3 1.5 FTE \$50,000

BUDGET AND FTEs:

-----FUNDED-----				
Source	Activity	Fund Type	Budget (\$1000s)	FTEs
Total:			0.00	0.00
-----UNFUNDED-----				
	Activity	Fund Type	Budget (\$1000s)	FTEs
Year 1:	RES	One-time	75.00	1.50
Total:			75.00	1.50

(Optional) Alternative Actions/Solutions and Impacts
(No information provided)

Compliance codes: EXCL (CATEGORICAL EXCLUSION)

Explanation: 516 DM6 APP. 7.4 B

Project Statement
Last Update: 01/31/97
Initial Proposal: 1994

CIRO-C-154.000
Priority: 8

Title: **LOCATE AND DOCUMENT HISTORIC HOMESTEAD SITES**

Funding Status: Funded: 0.00 Unfunded: 75.00

Servicewide Issues : C02 (ID & EVAL)
 C03 (SITE DOC)
Cultural Resource Type: SITE (Archeological Site)
N-RMAP Program codes :

10-238 Package Number :

Problem Statement

Our understanding and management of the archeological record of the reserve will benefit greatly from the locating and documentation of historic homestead sites.

Description of Recommended Project or Activity

Characterization and source identification of material types represented in reserve assemblages, experimental studies of raw materials used in homesteads native to the reserve, studies of remains from homesteads, and organization of the homestead sites are a few of the topics which should be covered in the study. Each site needs to be field tested and ground truthed and below ground remains inventoried and documented. This study will deepen the knowledge of the reserve's homesteading period and lead to improved efforts to discover, evaluate, interpret and manage these resources.

The documentation of the homestead will include but is not limited to: gathering and photocopying land plats and homestead patents.

Year 1 1 FTE \$50,000
Year 2 .5 FTE \$25,000

BUDGET AND FTEs:

-----FUNDED-----				
Source	Activity	Fund Type	Budget (\$1000s)	FTEs
Total:			0.00	0.00
-----UNFUNDED-----				
	Activity	Fund Type	Budget (\$1000s)	FTEs
Year 1:	RES	Recurring	50.00	1.00
Year 2:	RES	Recurring	25.00	0.50
Total:			75.00	1.50

(Optional) Alternative Actions/Solutions and Impacts
(No information provided)

Compliance codes: ARPA (ARCH. RES. PROT. ACT.)

Explanation:

Project Statement
Last Update: 01/31/97
Initial Proposal: 1994

CIRO-C-155.000
Priority: 9

Title: **PROVIDE MAPS OF ARCHEO/HIST SITES ALREADY SURVEYED**

Funding Status: Funded: 0.00 Unfunded: 20.00

Servicewide Issues : C04 (DATA RECOV)
Cultural Resource Type: SITE (Archeological Site)
N-RMAP Program codes :

10-238 Package Number :

Problem Statement

The documentation of the prehistory and history of the reserve is vital to completing a comprehensive picture of the entire reserve. Past archeological work has included the survey of known prehistory and history sites. The compilation of these known areas on a map is needed to avoid duplication of surveys and data recovery and aid in compliance requirements. This data would guide development and interpretation of the known sites.

Description of Recommended Project or Activity

Research and compilation would be needed from all known sources of archeological work that has taken place. This information would be entered on a map of the reserve. This project would relate to CIRO-C-150 Complete archeological inventory.

.5 FTE \$20,000

BUDGET AND FTEs:

-----FUNDED-----				
Source	Activity	Fund Type	Budget (\$1000s)	FTEs
			=====	=====
Total:			0.00	0.00
-----UNFUNDED-----				
	Activity	Fund Type	Budget (\$1000s)	FTEs
Year 1:	RES	One-time	50.00	1.00
Total:			50.00	1.00

(Optional) Alternative Actions/Solutions and Impacts
(No information provided)

Compliance codes: EXCL (CATEGORICAL EXCLUSION)

Explanation: 516 DM2 APP. 2, 1.6

Project Statement
Last Update: 01/31/97
Initial Proposal: 1994

CIRO-C-153.000
Priority: 4

Title: **DOCUMENT HISTORIC MINING SITES**

Funding Status: Funded: 0.00 Unfunded: 75.00

Servicewide Issues : C12 (ICAP)
C57 (SPEC STUDY)

Cultural Resource Type:
N-RMAP Program codes :

10-238 Package Number :

Problem Statement

The remnants of the mining practices that occurred within the reserve boundary are relatively few. Those that remain need to be documented and preserved to protect both the site and the reserve visitor.

Description of Recommended Project or Activity

This project would include defining mining sites; locating, photographing and mapping; gathering history of owners and mine; and stabilization and protection of each site.

This project would be accomplished by a graduate student in archeology or geology under the direction of a qualified professor and an archeologist or geologist under the direction of the CCSO archeologist.

BUDGET and FTEs: 1.5 FTE 75,000

BUDGET AND FTEs:

-----FUNDED-----				
Source	Activity	Fund Type	Budget (\$1000s)	FTEs
Total:			0.00	0.00
-----UNFUNDED-----				
	Activity	Fund Type	Budget (\$1000s)	FTEs
Year 1:	RES	One-time	20.00	0.50
Total:			20.00	0.50

(Optional) Alternative Actions/Solutions and Impacts
(No information provided)

Compliance codes: EXCL (CATEGORICAL EXCLUSION)

Explanation: 516 DM2 APP. 2, 1.11

Project Statement
Last Update: 08/13/96
Initial Proposal: 1994

CIRO-C-201.000
Priority: 999

Title: CONDUCT CULTURAL AFFILIATIONS STUDY

Funding Status: Funded: 0.00 Unfunded: 0.00

Servicewide Issues : C25 (CULT. AFFIL)
Cultural Resource Type: ETHN (Ethnographic Resources)
N-RMAP Program codes :

10-238 Package Number :

Problem Statement

The understanding of historical and contemporary relationships between certain indigenous populations and the natural and cultural resources of a reserve such as City of Rocks is important. The passage of the Native American Graves Protection and Repatriation Act (NAGPRA) in 1990 underscores the potential significance of such knowledge. The proposed cultural affiliation study will identify those contemporary populations which are most likely to have affiliations with either human remains and/or associated artifacts that might be discovered in the reserve, or with such materials that may already be in existing collections of cultural resources from reserve land. For federal agencies, determination of cultural affiliations is a critical step in complying with NAGPRA.

Description of Recommended Project or Activity

This research could be conducted in a one year period either by a qualified contractor or through a cooperative agreement with a university. The principal investigator must be an anthropologist or ethnohistorian, but the necessary research could be conducted by a graduate student under the direction of the principal investigator. Collaboration with reserve-associated tribes will be critical to the success of this study.

BUDGET AND FTEs:

-----FUNDED-----				
Source	Activity	Fund Type	Budget (\$1000s)	FTEs
			=====	=====
Total:			0.00	0.00
-----UNFUNDED-----				
	Activity	Fund Type	Budget (\$1000s)	FTEs
			=====	=====
Total:			0.00	0.00

(Optional) Alternative Actions/Solutions and Impacts
(No information provided)

Compliance codes: EXCL (CATEGORICAL EXCLUSION)

Explanation: 516 DM6 APP. 7.4 B

Project Statement
Last Update: 09/02/96
Initial Proposal: 1994

CIRO-C-250.000
Priority: 999

Title: **PREPARE SCOPE OF COLLECTIONS STATEMENT**

Funding Status: Funded: 0.00 Unfunded: 0.00

Servicewide Issues : C40 (SOC STATMT)
Cultural Resource Type: OBJC (Object)
N-RMAP Program codes :

10-238 Package Number :

Problem Statement

A Scope of Collection Statement (SOCS) is required by NPS-28, Cultural Resources management Guideline and is the basic curatorial planning document. The complex nature of the museum collection at City of Rocks requires a thorough SOCS. The SOCS defines the purpose of a museum collection; sets agreed-upon limits that specify the subject matter, geographical location, and time period to which the collection must relate; and considers the uses to which the collection will be put.

Description of Recommended Project or Activity

A draft was completed in 1994 and is currently under revision.

BUDGET AND FTEs:

-----FUNDED-----				
Source	Activity	Fund Type	Budget (\$1000s)	FTEs
			=====	=====
Total:			0.00	0.00
-----UNFUNDED-----				
	Activity	Fund Type	Budget (\$1000s)	FTEs
			=====	=====
Total:			0.00	0.00

(Optional) Alternative Actions/Solutions and Impacts
(No information provided)

Compliance codes: EXCL (CATEGORICAL EXCLUSION)

Explanation: 516 DM6 APP. 7.4 B

Project Statement
Last Update: 01/31/97
Initial Proposal: 1994

CIRO-C-251.000
Priority: 5

Title: **CATALOG MUSEUM COLLECTIONS**

Funding Status: Funded: 0.00 Unfunded: 0.00

Servicewide Issues : C46 (ACCOUNTBLY)
Cultural Resource Type: OBJC (Object)
N-RMAP Program codes :

10-238 Package Number :

Problem Statement

The lack of specialized, and sometimes general knowledge concerning the history, use, variations, and values (both monetary and cultural) of the reserve's museum objects leads to difficulty in planning exhibits, acquiring objects, cataloging objects, requesting conservation treatments, implementing the Scope of Collection Statement, and assessing the significance of collections. Expert research on artifacts is not readily available in the local area, and experts may be located some distance away from the collections. Research requires knowledge of the objects that are being reviewed, and the cultural affinities of objects can be very important for their proper management.

Description of Recommended Project or Activity

The specific issues and needs at City of Rocks National Reserve include the updated version of the NPS-approved Automated National Cataloguing System (ANCS).

BUDGET AND FTEs:

-----FUNDED-----				
Source	Activity	Fund Type	Budget (\$1000s)	FTEs
			=====	=====
Total:			0.00	0.00
-----UNFUNDED-----				
	Activity	Fund Type	Budget (\$1000s)	FTEs
			=====	=====
Total:			0.00	0.00

(Optional) Alternative Actions/Solutions and Impacts
(No information provided)

Compliance codes: DOC (COVERED BY ANOTHER DOC)

Explanation: 516 DM2 APP. 2, 1.6

Project Statement
Last Update: 09/02/96
Initial Proposal: 1994

CIRO-C-282.000
Priority: 999

Title: **PURCHASE MUSEUM STORAGE AND SECURITY EQUIPMENT**

Funding Status: Funded: 0.00 Unfunded: 0.00

Servicewide Issues : C45 (HOUSKP PLN)
Cultural Resource Type: OBJC (Object)
N-RMAP Program codes :

10-238 Package Number :

Problem Statement

City of Rocks has an unknown number of museum objects store both on and off-site. The current storage space and its environment, security, and fire detection/suppression are inadequate for meeting NPS museum storage standards. Deficiencies are noted in the reserve's completed DOI Checklist for Preservation, Protection, and Documentation of Museum Property.

Description of Recommended Project or Activity

A new facility which meets NPS standards for museum storage space will assure the collections of long-term survival and integrity. The existing equipment and supplies do not meet standards and will need to be augmented or updated with additional equipment and supplies.

BUDGET AND FTEs:

-----FUNDED-----				
Source	Activity	Fund Type	Budget (\$1000s)	FTEs
			=====	=====
Total:			0.00	0.00
-----UNFUNDED-----				
	Activity	Fund Type	Budget (\$1000s)	FTEs
			=====	=====
Total:			0.00	0.00

(Optional) Alternative Actions/Solutions and Impacts
(No information provided)

Compliance codes: DOC (COVERED BY ANOTHER DOC)

Explanation: 516 DM6 APP. 7.4 E

Project Statement
Last Update: 09/02/96
Initial Proposal: 1994

CIRO-C-300.000
Priority: 999

Title: **COMPLETE CULTURAL LANDSCAPE INVENTORY**

Funding Status: Funded: 0.00 Unfunded: 100.00

Service-wide Issues : C10 (INVENTORY)
Cultural Resource Type: CULL (Cultural Landscape)
N-RMAP Program codes :

10-238 Package Number :

Problem Statement

This project is needed to comply with legislative mandates addressing the section 110 requirement of the National Historic Preservation Act (NHPA) to identify, document, and assess cultural resources in every park unit.

Description of Recommended Project or Activity

The Cultural Landscapes Inventory (CLI) for the reserve will be completed to include all information required as part of the NPS service-wide CLI, sections I, II, and III (location map, regional context map, a site map recording existing conditions, documentation of cultural characteristics including response to natural features, overall landscape organization, land use, vegetation, circulation systems, cluster arrangement, structures, and small-scale features such as fences and walls). The CLI will also document the condition of significant cultural landscape features and will identify management requirements for treatment. The inventory will contain cross-references with the List of Classified Structures (LCS), the Cultural Sites Inventory (CSI), and natural resource data bases.

The CLI will be conducted in three phases (reflecting three levels of investigation) and provide baseline data for evaluating the eligibility of the landscape for listing in the National Register of Historic Places. This inventory will be a valuable reference for resource planning, compliance, monitoring, protection, and budget development. The data will be part of the Service-wide data base, and will be maintained in the system support office.

Funding for the CLI will be a combination of reserve base funds and Service-wide special initiative funds. Overall coordination for the CLI will be the responsibility of the SSO Historical Landscape Architect, in collaboration with reserve staff. Inventory work will require a combination of seasonal and full-time landscape architects (GS-09) with backgrounds in cultural landscapes, and a historian (GS-09) plus travel and supplies

BUDGET AND FTEs: 1.5 FTEs est 100,000

BUDGET AND FTEs:

-----FUNDED-----				
Source	Activity	Fund Type	Budget (\$1000s)	FTEs
Total:			0.00	0.00
-----UNFUNDED-----				
	Activity	Fund Type	Budget (\$1000s)	FTEs
Year 1:	RES	One-time	100.00	1.50
Total:			100.00	1.50

(Optional) Alternative Actions/Solutions and Impacts
(No information provided)

Compliance codes: EXCL (CATEGORICAL EXCLUSION)

Explanation: 516 DM6 APP. 7.4 B

Last Update: 01/31/97
Initial Proposal: 1994

Project Statement

CIRO-C-301.000
Priority: 10

Title: **IDENTIFY SIGNIFICANT HISTORIC VIEWS AND VIEWSHEDS**

Funding Status: Funded: 0.00 Unfunded: 0.00

Servicewide Issues : C72 (PROTECTION)
 N16 (NEAR-PARK DEV)
Cultural Resource Type: CULL (Cultural Landscape)
N-RMAP Program codes : I00 (Interp. of Natural Resource Issues)

10-238 Package Number :

Problem Statement

The Comprehensive Management Plan (CMP) for the reserve identifies the following cultural resource management objectives: (1) preserve the pristine scenic vistas seen by the emigrants along the California Trail; (2) identify, protect, and preserve elements contributing to an ambience and scenic quality reminiscent of the American West; and (3) identify, inventory, protect, and preserve all historic properties eligible for the national register, including sites, objects, landscapes, districts, and traditional cultural properties associated with the prehistoric and historic human occupation of the reserve and archeological resources (page 14). During the Comprehensive Management Planning process three important cultural views associated with the views experienced by the California Trail emigrants were identified and delineated (pages 105-107). But, significant cultural/historic views and viewsheds bearing scenic quality reminiscent of the American West were not identified and delineated. These views and viewsheds coincide with historic properties identified in the third objective listed above.

Description of Recommended Project or Activity

Technical assistance from a cultural landscape architect is needed to utilize the Cultural Landscape Inventory (C-300.000) in identifying and delineating views and viewsheds from sites identified during the Cultural Sites Inventory (C-101.000).

OTHER RELATED PROJECTS

C-100.000 Develop list of classified structures
C-101.000 Develop cultural sites inventory
C-120.000 Complete a historic resources study
C-153.000 Document historic mining sites
C-154.000 Locate and document historic homestead sites
I-204.000 Identify and evaluate traditional cultural properties

N-402.000 Identify internal and external historic and scenic
vistas
I-403.000 Restore and protect scenic qualities of vistas
Nearly all Cultural / Historic Landscape project statements

BUDGET AND FTEs:

-----FUNDED-----				
Source	Activity	Fund Type	Budget (\$1000s)	FTEs
			=====	=====
Total:			0.00	0.00

-----UNFUNDED-----				
	Activity	Fund Type	Budget (\$1000s)	FTEs
			=====	=====
Total:			0.00	0.00

(Optional) Alternative Actions/Solutions and Impacts
(No information provided)

Compliance codes: EXCL (CATEGORICAL EXCLUSION)

Explanation: 516 DM2 APP. 2, 1.6

Project Statement

Last Update:
Initial Proposal: 1996

CIRO-I-008.000
Priority:

Title: **Develop Research Natural Area (RNA) Management Plan**

Funding Status: Funded: 0.00 Unfunded: 120.00

Servicewide Issues : N20 (Baseline Data)
 N17 (Biodiversity)

Cultural Resource Type:

N-RMAP Program codes : C00 (Collections and Data Management)
 C01 (Natural Resource Collections Mgmt)

10-238 Package Number :

Problem Statement

Prior to City of Rocks becoming a unit of the National Park System, the Bureau of Land Management and U.S. Forest Service designated a 312-acre undisturbed area of the reserve as a Research Natural Area to preserve important vegetation types with unique and special characteristics and outstanding examples of geological processes of scientific interest. The special features of the site are the high degree of habitat and floristic diversity: the area contains the northern limit of the pinon-juniper vegetation type, an example of a sagebrush steppe vegetation type in a rare natural condition, and excellent examples of bornhardt rocks formed by exfoliation processes.

With its designation the City of Rocks RNA effectively became part of a national network of ecological field sites designated for its research and educational value. In general terms a RNA like City of Rocks typifies a physical or biological unit representing an ecological community type, ideally having had little anthropogenic disturbance in the past, and in which current natural processes are allowed to continue. Research Natural Areas are managed exclusively for approved non-manipulative research---research that samples, but does not alter the existing condition. (NPS-77, Natural Resources Management Guidelines, 4, pp. 13-17)

The NPS Management Policies states, " Superintendents will cooperate with other federal land managers in identifying park sites for designation and in planning research and educational activities for this interagency program. Research natural areas will be managed to provide the greatest possible protection of site integrity in accordance with their designation". (4:4)

The importance of cooperative management strategies should be stressed in order to preserve these rare vegetative types and geological components of the reserve.

Description of Recommended Project or Activity

Research:

An inventory of geological and biological resources in the research natural area will be conducted. Results of past and future inventories will be maintained in a research natural area database and integrated into a Geographic Information System (GIS).

The RNA inventory data or a representative "snap-shot" should be compared to data collected reserve-wide, providing an analyses of differences between areas with significantly different levels of use and resource protection.

Monitoring:

A comprehensive, long-term monitoring plan will be developed for the RNA incorporating both geological and biological protocols.

Human impacts and other anthropogenic influences will be inventoried and monitored and mitigation strategies developed to protect the RNA.

Administration:

The Chief Ranger of the reserve, in cooperation with the Columbia Cascades Support Office's Natural Resource Division, will develop priorities for research in the RNA and will coordinate all research activities carried out there.

The Resource Management Division of City of Rocks National Reserve will develop standards and procedures for the issuance of research and collecting permits within the RNA.

BUDGET AND FTEs:

-----FUNDED-----					
Source	Activity	Fund Type	Budget	(\$1000s)	FTEs
			=====		
Total:			0.00		0.00
-----UNFUNDED-----					
	Activity	Fund Type	Budget	(\$1000s)	FTEs
			=====		
Year 1:	ADM	Recurring		2.00	0.10
	MON	Recurring		8.00	0.30
	RES	Recurring		20.00	0.60
		Subtotal:		30.00	1.00
Year 2:	ADM	Recurring		2.00	0.10
	MON	Recurring		8.00	0.30
	RES	Recurring		20.00	0.60
		Subtotal:		30.00	1.00
Year 3:	ADM	Recurring		2.00	0.10
	MON	Recurring		8.00	0.30
	RES	Recurring		20.00	0.60
		Subtotal:		30.00	1.00
Year 4:	ADM	Recurring		2.00	0.10
	MON	Recurring		8.00	0.30
	RES	Recurring		20.00	0.60
			=====		
TOTAL:				120.00	4.00

(Optional) Alternative Actions/Solutions and Impacts
(No information provided)

Compliance codes: EXCL (CATEGORICAL EXCLUSION)

Explanation: 516 DM2 APP. 2, 1.6

Project Statement **CIRO-I-080.000**
Last Update: 11/22/96 Priority: 12
Initial Proposal: 1994

Title: **DEVELOP AND MAINTAIN GEOGRAPHIC INFORMATION SYSTEM**

Funding Status: Funded: 0.00 Unfunded: 80.00

Servicewide Issues : C62 (GIS)
Cultural Resource Type:
N-RMAP Program codes : C00 (Collections and Data Management)
C03 (GIS/Data Management)

10-238 Package Number :

Problem Statement

Effective management of park resources requires that there be access to critical data by park resource management staff. As there are no plans for a GIS specialist on staff the system must allow for easy storage, retrieval, manipulation, and output of data by non-technical personnel.

Description of Recommended Project or Activity

Develop a geographic information system for the park, to be jointly maintained by personnel from the park, the System Support Office, and other agencies and organizations as appropriate. Begin with an assessment of data needs and holdings relevant to the most critical park issues. A park GIS plan will be written if it is deemed critical to the operation's success. Essential data layers missing from the database will be produced, and high speed access to the Internet will be made available. When the initial development phase is completed, park staff will be responsible for routine uses of the system, such as production of simple maps, entry of attribute data, input of spatial data from GPS (including field checking existing data), and system backups. Due to the lack of permanent personnel at the park with specialized skills to operate and maintain the more advanced functions of a geographic information system, the park must rely on outside sources to accomplish some tasks. These tasks will include spatial data development, spatial analyses, advanced map production, and data archiving. Support will come from the System Support Office and through cooperative agreements with neighboring agencies and organizations.

RELATED PROJECT STATEMENTS:

This project relates to all natural and cultural resource inventory project statements.

BUDGET AND FTEs:

		-----FUNDED-----		
Source	Activity	Fund Type	Budget (\$1000s)	FTEs
Total:			0.00	0.00
		-----UNFUNDED-----		
	Activity	Fund Type	Budget (\$1000s)	FTEs
Year 1:	MON	One-time	30.00	0.25
	MON	Recurring	5.00	0.10
Subtotal:			35.00	0.35
Year 2:	MON	One-time	30.00	0.25
	MON	Recurring	5.00	0.10
Subtotal:			35.00	0.35
Year 3:	MON	Recurring	5.00	0.10
Year 4:	MON	Recurring	5.00	0.10
Total:			80.00	0.90

(Optional) Alternative Actions/Solutions and Impacts
(No information provided)

Compliance codes: EXCL (CATEGORICAL EXCLUSION)

Explanation: 516 DM6 APP. 7.4 E(2)

Project Statement
Last Update: 09/02/96
Initial Proposal: 1994

CIRO-I-280.000
Priority: 999

Title: **DEVELOP COLLECTIONS MANAGEMENT PLAN**

Funding Status: Funded: 0.00 Unfunded: 0.00

Servicewide Issues : C41 (CMP)
Cultural Resource Type: OBJC (Object)
N-RMAP Program codes :

10-238 Package Number :

Problem Statement

A Collection Management Plan (CMP) has not been prepared for City of Rocks National Reserve. NPS-28, the Cultural Resource Management Guideline, states that "Each park...with a collection should have a Collection Management Plan." This plan would assist the reserve in finding solutions to the current inadequacies of museum storage.

Description of Recommended Project or Activity

The CMP will evaluate all phases of the reserve collection management program. Topics will include an evaluation of the Scope of Collection Statement, museum record keeping, present storage area and facilities, storage and exhibit environment, preventive conservation program, museum security, staffing and planning.

BUDGET AND FTEs:

-----FUNDED-----				
Source	Activity	Fund Type	Budget (\$1000s)	FTEs
			=====	=====
Total:			0.00	0.00
-----UNFUNDED-----				
	Activity	Fund Type	Budget (\$1000s)	FTEs
			=====	=====
Total:			0.00	0.00

(Optional) Alternative Actions/Solutions and Impacts
(No information provided)

Compliance codes: EXCL (CATEGORICAL EXCLUSION)

Explanation: 516 DM6 APP. 7.4 B(2)

Project Statement
Last Update: 11/22/96
Initial Proposal: 1994

CIRO-I-333.000
Priority: 11

Title: DEVELOP/IMPLEMENT CA TRAIL MANAGEMENT PLAN W/ MONITORING

Funding Status: Funded: 0.00 Unfunded: 250.00

Servicewide Issues : C11 (REPORT)
Cultural Resource Type: CULL (Cultural Landscape)
N-RMAP Program codes :

10-238 Package Number :

Problem Statement

The California Trail is an important natural and cultural feature of City of Rocks as nine miles of the trail are contained within the reserve boundary. The preservation of this trail is called for in the Comprehensive Management Plan. Developing and implementing a management plan are part of the preservation process.

Description of Recommended Project or Activity

The development of a California Trail and Corridor Management Plan would accurately address management issues and concerns in protecting the significant resource. Recommendations from the CLR will be incorporated into the management plan. The plan will include a monitoring plan and implementation schedule. The critical cultural resource elements in the California trail corridor would be defined as would important related features/elements outside of the 1/2 mile corridor. The plan would also define the restoration of vegetation characteristics of the California Trail period as defined in the Comprehensive Management Plan. Issues that will be addressed in the Management Plan include but are not limited to the following: vegetation enhancement, visitor use, erosion of ruts and interpretive facilities. The development of the plan would take approximately one year.

The implementation of the California Trail Corridor Management Plan would follow the recommendations of the CLR and California Trail Management plan in the areas of rehabilitating eroded areas and managing vegetation as recommended. This would also included the following but are not limited to: managing vegetation as appropriate and restoring vegetation characteristics of the California Trail period. The implementation would take approximately two years.

Year 1 1 FTE \$50,000
Year 2 2 FTE \$100,000
Year 3 2 FTE \$100,000

BUDGET AND FTEs:

-----FUNDED-----				
Source	Activity	Fund Type	Budget (\$1000s)	FTEs
Total:			0.00	0.00
-----UNFUNDED-----				
	Activity	Fund Type	Budget (\$1000s)	FTEs
Year 1:	RES	Recurring	50.00	1.00
Year 2:	RES	Recurring	100.00	2.00
Year 3:	RES	Recurring	100.00	2.00
Total:			250.00	5.00

(Optional) Alternative Actions/Solutions and Impacts
(No information provided)

Compliance codes: EXCL (CATEGORICAL EXCLUSION)

Explanation: 516 DM6 APP. 7.4 B

Project Statement
Last Update: 01/02/97
Initial Proposal: 1994

CIRO-I-451.000
Priority: 999

Title: CONTROL SOIL EROSION AND SEDIMENTATION

Funding Status: Funded: 0.00 Unfunded: 0.00

Servicewide Issues : C70 (ENVRM IMPCT)
 N08 (CULT LANDSCAPE)
Cultural Resource Type: CULL (Cultural Landscape)
N-RMAP Program codes : D00 (Disturbed Area Rehabilitation)

10-238 Package Number :

Problem Statement

Due to the nature of the geology, climate, and vegetation the soil is highly erodible. Previous land uses and visitor impacts have accelerated the rate of erosion and sediment loading in intermittent streams. Once vegetative cover is lost, the process of channeling increases exponentially.

Description of Recommended Project or Activity

This project ties in with the geologic project to produce a terrain analysis map. Areas of high, moderate and low erosion, and high, moderate and low deposition, will be mapped under consideration of the nature of the soils, geology, topography (slope, DEM), and existing impacted areas. High erosion source sites will be identified, mapped, and assessed as to whether they are natural or caused by human activity. Sites will then be prioritized for mitigation. Mitigation will emphasize initially correcting upland land-use practices that perpetuate unnecessary runoff patterns that lead to excessive erosion, accompanied by topographic restoration to restore natural surface runoff behavior, and revegetation.

BUDGET AND FTEs:

-----FUNDED-----				
Source	Activity	Fund Type	Budget (\$1000s)	FTEs
Total:			0.00	0.00
-----UNFUNDED-----				
	Activity	Fund Type	Budget (\$1000s)	FTEs
Total:			0.00	0.00

(Optional) Alternative Actions/Solutions and Impacts

No action will result in excellerated resource damage.

Compliance codes: EXCL (CATEGORICAL EXCLUSION)

Explanation: 516 DM6 APP. 7.4 E

Last Update: 09/02/96
Initial Proposal: 1994

Project Statement

CIRO-I-810.000
Priority: 999

Title: **DEVELOP AND IMPLEMENT ROCK CLIMBING MANAGEMENT PLAN**

Funding Status: Funded: 0.00 Unfunded: 0.00

Servicewide Issues : C71 (VISIT IMPCT)
 N18 (VIS USE-BCTRY)
Cultural Resource Type: CULL (Cultural Landscape)
N-RMAP Program codes : G00 (Geologic Resources Management)

10-238 Package Number :

Problem Statement

CIRO's rock climbing popularity began in the late 1960's. Since its meager beginnings as a "local" hot spot for Salt Lake City, Pocatello, and Boise climbers, CIRO has grown into one of the most popular sport climbing sites in North America, rivalling such well known sites as Joshua Tree National Monument, Smith Rock, Devil's Tower National Monument, and "The Gunks". CIRO's characteristically clean granite attracts an average of 60,000 climbers annually. Climbers account for 65-75% of the Reserve's visitation; thus, the need for a climbing management plan becomes obvious. In order to protect both cultural and natural resources, policies must be set in place to: limit the proliferation of bolting; to prevent chipping, gluing and resource modification; protect raptor nest sites and fragile plant communities on and within the cracks adjacent to or along many climbing routes; to prevent the loss immigrant inscriptions; and to protect the silence which is one of the qualities for which CIRO is known and originally name for: Cassia Silent City of Rocks.

Description of Recommended Project or Activity

The Plan should summarize the current use and history of climbing at CIRO. It should include current policies and mandates for the management of climbing. It should explain how such policies will protect the resources, while still providing this demanded recreational opportunity. The plan should include input from cultural and natural resource specialists, climbing and historical organizations, and CIRO visitors--both climbing and non-climbing.

BUDGET AND FTEs:

-----FUNDED-----				
Source	Activity	Fund Type	Budget (\$1000s)	FTEs
			=====	=====
Total:			0.00	0.00
-----UNFUNDED-----				
	Activity	Fund Type	Budget (\$1000s)	FTEs
			=====	=====
Total:			0.00	0.00

(Optional) Alternative Actions/Solutions and Impacts

If a climbing management plan is not developed, resource damage will occur at a near uncontrollable rate, and park staff will lack direction on how to protect these resources while providing a viable recreational opportunity for visitors.

Compliance codes: EXCL (CATEGORICAL EXCLUSION)

Explanation: 516 DM6 APP. 7.4 A(10)

Project Statement
Last Update: 02/06/97
Initial Proposal: 1994

CIRO-I-810.001
Priority: 2

Title: **DEVELOP AND IMPLEMENT ROCK CLIMBING MANAGEMENT PLAN**
Sub-title: **INVENTORY CLIMBING ROUTES**

Funding Status: Funded: 0.00 Unfunded: 61.00

Service-wide Issues : N18 (VIS USE-BCTRY)
Cultural Resource Type:
N-RMAP Program codes :

10-238 Package Number :

Problem Statement

City of Rocks is estimated to have over 300 bolted routes and an additional 300 natural protection routes. In order to monitor the conditions of these, to determine the location of these, and to insure compliance with established policies and permits, an understanding of the existing climbing routes is needed. This information will assist resource managers in determining which routes might be closed for resource protection, and where new routes might be consistent with providing this form of recreation within the reserve.

Description of Recommended Project or Activity

City of Rocks personnel will develop a data base program for the collection and retention of climbing route information. Initially, all routes will have to be climbed, and data entered into computer. Information to collect would include such basics as: name of route, other names known by, rating of climb, length of climb, number of bolts, type of descent, hazards, obvious current impacts, accessed by which trails, number of users, popularity, etc...

The climbing ranger would oversee this project, and play a major role in the data collection; however, additional FTE is needed to develop the program and collect the data.

BUDGET AND FTEs:

		-----FUNDED-----		
Source	Activity	Fund Type	Budget (\$1000s)	FTEs
Total:			0.00	0.00
		-----UNFUNDED-----		
	Activity	Fund Type	Budget (\$1000s)	FTEs
Year 1:	ADM	One-time	1.00	0.10
	RES	One-time	30.00	1.00
Subtotal:			31.00	1.10
Year 2:	MON	Cyclic	15.00	0.40
Year 3:	MON	Cyclic	15.00	0.40
Total:			61.00	1.90

(Optional) Alternative Actions/Solutions and Impacts
(No information provided)

Compliance codes: EXCL (CATEGORICAL EXCLUSION)

Explanation: 516 DM2 APP. 2, 1.6

Last Update: 03/29/97
Initial Proposal: 1994

Project Statement

CIRO-I-820.000
Priority: 3

Title: **INVENTORY AND MAP CURRENT TRAILS**

Funding Status: Funded: 0.00 Unfunded: 1.00

Servicewide Issues : C71 (VISIT IMPCT)
N22 (VIS USE-DEV ZN)
Cultural Resource Type: CULL (Cultural Landscape)
N-RMAP Program codes : D00 (Disturbed Area Rehabilitation)

10-238 Package Number :

Problem Statement

Prior to designation as a National Reserve, a number of trails existed, some dating back 140 years. In the years just prior to designation, trails proliferated due to the increase in climbers creating their own access to rocks, and due to unrestricted off-road vehicle use. Additionally, many trails originated by cattle trailing and grazing. Before a trail management plan can be developed, it's imperative that the current trails be inventoried. Following this, criteria need to be developed to determine which trails should be closed, which should be maintained, and which should be upgraded and utilized for interpretive purposes.

Description of Recommended Project or Activity

Every trail will be measured for length using a common Rolatape brand counter. Highest and lowest elevation points will be measured for each trail using an Avocet altimeter to determine total relief. The altimeter will be calibrated at least once a day, more often if there are changes in the weather, at an identified benchmark referenced on the USGS Almo quadrangle (eg: north intersection in the town of Almo, turn off to the reserve south of Almo, Emery Pass). Trails will be described as to current use and condition (eg: entrenched, headward eroded, side-wall eroded, buried, impacts to vegetation). Gradient (slope) will be measured for trail segments using a Suunto clinometer. This information will be used to assess and mitigate impacts of trails to cultural and natural resources, and in the development of the trail management plan.

RELATED PROJECTS:

821.000 Assess impact of trails to cultural & natural resources
 823.000 Develop and implement a Comprehensive Trail System
 Management Plan
 825.000 Monitor and manage trail use and camping
 810.002 Document current impact due to human activities
 811.000 Mitigate environmental impacts of climbing

BUDGET AND FTEs:

-----FUNDED-----				
Source	Activity	Fund Type	Budget (\$1000s)	FTEs
Total:			0.00	0.00

-----UNFUNDED-----				
	Activity	Fund Type	Budget (\$1000s)	FTEs
Year 1:	RES	One-time	1.00	0.01
Total:			1.00	0.01

(Optional) Alternative Actions/Solutions and Impacts
 (No information provided)

Compliance codes: EXCL (CATEGORICAL EXCLUSION)

Explanation: 516 DM2 APP. 2, 1.6

Last Update: 11/19/96
Initial Proposal: 1994

Project Statement

CIRO-I-822.000
Priority: 999

Title: **ASSESS RESOURCE CONDITION OF CAMPGROUNDS**

Funding Status: Funded: 0.00 Unfunded: 5.00

Servicewide Issues : N22 (VIS USE-DEV ZN)
 N06 (LAND USE PRAC)

Cultural Resource Type:
N-RMAP Program codes :

10-238 Package Number :

Problem Statement

Prior to establishment of the reserve, approximately 100 campsites were indiscriminantly created by users. Previous land managers (USFS and BLM) did not provide for resource stewardship through standardized criteria of site-selection and development of campsites. This was partly due to low levels of use, but the boom in climbing activity during the mid-1980s changed this. Consequently, loss of vegetation and compaction of soils has occurred at and around these sites, especially from the driving of vehicles off road, resulting in increased erosive activity. When NPS and IDP&R management began, indiscriminate camping was curtailed by closing several severely impacted campsites and designating others as interim "official" campsites until they could be evaluated along with the road and trail network in the overall context of management objectives to be identified in the Comprehensive Management Plan, and the slope stability and erosion characteristics of each site.

The Comprehensive Management Plan has since proposed the removal of all campsites from near the ridge above Circle Creek Basin, along with a segment of the main road through the reserve, and development of a new "campground" near, but not within, the aspen grove near Nematode Rock. This would be a walk-in campground to 50 primitive sites. Resource specialists question the appropriateness of locating a high-use area so close to the aspen grove considering the increased threat to aspen rejuvenation that would be caused by trampling. We should explore reconfiguring existing disturbed sites, even though there may be some instances where we may need to completely vacate a site and restore it, rather than impact a currently undisturbed area.

An assessment is needed to determine the appropriateness of the CMP's recommendations. If removal of the existing campsites is not warranted, then each site and the network of roadways between them, need to be evaluated for their use patterns and disturbance characteristics. A design layout then needs to be developed that

will identify how to stabilize site for continued use, and better define and control vehicular access. It is expected that some existing sites will need to be vacated and restored. Potential new sites will be identified for future development is warranted.

Description of Recommended Project or Activity

NPS Landscape designer, NPS resource specialist, and CIRO resource specialist will convene on sight for one week, to assess each site, and determine criteria for proper placement and/or removal, as well as determine strategies for erosion control, landscape and rehabilitation. Aerial photos will be consulted, sites will be photo-documented, and some crucial information incorporated into GIS. Landscape materials and standards will be established to comply with CMP recommendations. At least two sites will be completed to standard, as an example for the entire project and to train reserve staff on methodology. Another important product of this assessment will be a final recommendation and strategy for the layout and restoration of all campsites within the reserve to resolve the CMP recommendation for removal of these sites and construction of a new campground elsewhere.

BUDGET AND FTEs:

-----FUNDED-----					
Source	Activity	Fund Type	Budget (\$1000s)	FTEs	
Total:			0.00	0.00	
-----UNFUNDED-----					
	Activity	Fund Type	Budget (\$1000s)	FTEs	
Year 1:	RES	One-time	5.00	0.10	
Total:			5.00	0.10	

(Optional) Alternative Actions/Solutions and Impacts
(No information provided)

Compliance codes: EXCL (CATEGORICAL EXCLUSION)

Explanation: 516 DM6 APP. 7.4 B(10)

CIRO-I-823.000
Priority: 4

Develop a Trail System and Management Plan for the Reserve. This plan will identify and describe a variety of trail corridors designed to provide access to significant resources and recreational opportunities, while preserving natural resources and features. The plan will address the need for a variety of types of trails such as hiking, horseback riding, and access trails to campgrounds, climbing areas and historic sites. The plan will also address the location and alignment, appropriate character, signage, and materials for all trails. As such, the trail system part of the plan will follow the geology projects calling for the mapping of the reserve's bedrock, Quaternary geology and fragile features, which will culminate in the production of a terrain analysis map. The terrain analysis map will be critical in the design of a trail network that is sensitive to the erosive nature of the soils; to be used in conjunction with the identified trail needs for interpretation in removing old unneeded trails, relocating unstable portions of retained trails, and site-selecting new trails. This plan will tie directly to the Interpretive Plan (in draft), or be developed in conjunction with

that plan. The plan will also document the need for easements, right-of-way, partnerships with other federal agencies and private landowners, and a phasing plan for implementation.

RELATED PROJECTS IN THE RESOURCES MANAGEMENT PLAN

I-333.000 Develop and implement California Trail Mgmt. Plan
 I-451.000 Control soil erosion and sedimentation
 N-460.000 Rehabilitate eroded areas
 N-640.000 Management plan for quaking aspen groves
 N-820.000 Inventory and map current trails

BUDGET AND FTEs:

-----FUNDED-----				
Source	Activity	Fund Type	Budget (\$1000s)	FTEs
Total:			0.00	0.00
-----UNFUNDED-----				
	Activity	Fund Type	Budget (\$1000s)	FTEs
Year 1:	ADM	Cyclic	5.00	0.30
	MIT	Recurring	40.00	1.50
		Subtotal:	45.00	1.80
Year 2:	MIT	Recurring	40.00	1.50
Year 3:	MIT	Recurring	40.00	1.50
Year 4:	MIT	Recurring	40.00	1.50
		Total:	165.00	6.30

(Optional) Alternative Actions/Solutions and Impacts
 (No information provided)

Compliance codes: ARPA (ARCH. RES. PROT. ACT.)

Explanation: 516 DM6 APP. 7.4 E(1)

Project Statement
Last Update: 11/19/96
Initial Proposal: 1994

CIRO-I-840.000
Priority: 999

Title: **RESEARCH AND DEVELOP A GRAZING MANAGEMENT PLAN**

Funding Status: Funded: 0.00 Unfunded: 0.00

Service-wide Issues : C70 (ENVRM IMPCT)
 N04 (NON-NAT ANIMAL)
Cultural Resource Type: CULL (Cultural Landscape)
N-RMAP Program codes :

10-238 Package Number :

Problem Statement

In establishing the National Reserve in 1988 with Public Law 100-696, Congress recognized that appropriate management of the area necessitated cooperative and joint resource use management. Public Law 100-696 directs the NPS to formulate the management of the reserve so that public use, historic and natural resource preservation and private use, appropriate to the area's historical rural setting, is assured.

Even though NPS policy and 36 CFR, Sec 2.60, prohibits livestock use in park areas where that use is not expressly authorized, the legislated mandate to "...protect the historic rural setting" and facilitate continuing private use of public lands within the reserve, is sufficient authority for managing grazing within CIRO. This interpretation of Congressional intent was validated by the opinion rendered by the Assistant Regional Solicitor, Pacific Northwest Region. The solicitor's opinion was predicated on 36 CFR Sec 2.60 (a) (3), which states that livestock use is prohibited except when it is "...necessary...or required in order to maintain a historic scene".

Based on this ruling, and in order to protect both natural and cultural resources, a grazing management plan is needed.

Description of Recommended Project or Activity

Develop a plan which regulates the livestock use within the reserve, coordinates with sound management plans in use by adjacent agencies and private landowners, and protects the natural and cultural resources within the reserve.

BUDGET AND FTEs:

-----FUNDED-----				
Source	Activity	Fund Type	Budget (\$1000s)	FTEs
Total:			0.00	0.00
-----UNFUNDED-----				
	Activity	Fund Type	Budget (\$1000s)	FTEs
Year 3:	PRO	One-time	0.00	0.30
Total:			0.00	0.30

(Optional) Alternative Actions/Solutions and Impacts

Failure to develop a plan will risk damage to natural and cultural resources which the reserve is mandated to protect.

Compliance codes: EXCL (CATEGORICAL EXCLUSION)

Explanation: 516 DM2 APP. 2, 1.6

Project Statement
Last Update: 09/02/96
Initial Proposal: 1994

CIRO-I-884.000
Priority: 999

Title: **DEVELOP A HAZARDOUS MATERIALS MANGMNT/RESPONSE PLAN**

Funding Status: Funded: 0.00 Unfunded: 0.50

Servicewide Issues : C70 (ENVRM IMPCT)
Cultural Resource Type:
N-RMAP Program codes : E00 (Environmental Planning and
 Compliance)

10-238 Package Number :

Problem Statement

CIRO generates a number of hazardous materials in the course of its operation. Storage and disposal of this material must follow EPA, DEQ and other environmental regulations.

Description of Recommended Project or Activity

CIRO will develop and follow proper storage and disposal/recycle procedures. CIRO will also develop a Haz-Mat inventory and tracking system, and a Haz-Mat communication program.

BUDGET AND FTEs:

		-----FUNDED-----		
Source	Activity	Fund Type	Budget (\$1000s)	FTEs
Total:			0.00	0.00
		-----UNFUNDED-----		
	Activity	Fund Type	Budget (\$1000s)	FTEs
Year 3:	PRO	Recurring	0.50	0.10
Total:			0.50	0.10

(Optional) Alternative Actions/Solutions and Impacts
(No information provided)

Compliance codes: EXCL (CATEGORICAL EXCLUSION)

Explanation: 516 DM2 APP. 2, 1.5

Project Statement
Last Update: 03/26/97
Initial Proposal: 1994

CIRO-N-400.000
Priority: 999

Title: ESTABLISH BASELINE AND MONITOR THE NIGHT SKY

Funding Status: Funded: 0.00 Unfunded: 8.00

Servicewide Issues : N20 (BASELINE DATA)
N14 (AIR POLLUTION)
Cultural Resource Type:
N-RMAP Program codes : A00 (Air Resources Management)
10-238 Package Number :

Problem Statement

The Reserve has identified a number of Air Quality Related Values (AQRV) such as visibility and scenic vistas. Establishing a baseline and monitoring the Night Sky will be a program that will provide information on both aesthetic and air quality resources. Accordingly, this program will be integrated with the scenic and aesthetic program and the air quality monitoring program.

At the present time the Night Sky at the Reserve is not significantly impacted from light intrusion. There are no sources along the boundary or outside the boundary that can be discerned from the interior of the Reserve. Additionally, there are no significant sources within the Reserve that impact the Night Sky. Temporary impacts occur within the Reserve from the various camping areas. Consequently, the Reserve has the opportunity to document a resource that is pristine and unimpacted.

Description of Recommended Project or Activity

The first step in this program would be to inventory the existing and temporary sources that can impact this resource. This should be done not only for the current operation, but also for the operation of the Reserve as outlined in the Comprehensive Management Plan. From this point a representative number of monitoring stations can be established and measurements of the ambient light can be taken on a seasonal basis. This will establish a baseline and allow for measuring change over time.

Additionally, Reserve staff will coordinate with surrounding land managers to ensure minimization and mitigation of any intrusions that may develop in the future. Interpretation of this resource can be an important part of the Reserve's overall interpretive program. Coordination with local astronomy departments at nearby colleges would facilitate this endeavor.

RELATED PROJECTS FROM THE RESOURCES MANAGEMENT PLAN

N-421.001 Establish baseline air quality

BUDGET AND FTEs:

-----FUNDED-----					
Source	Activity	Fund Type	Budget (\$1000s)	FTEs	
Total:			0.00	0.00	
-----UNFUNDED-----					
	Activity	Fund Type	Budget (\$1000s)	FTEs	
Year 1:	RES	One-time	5.00	0.30	
Year 2:	MON	Recurring	1.00	0.10	
Year 3:	MON	Recurring	1.00	0.10	
Year 4:	MON	Recurring	1.00	0.10	
Total:			8.00	0.60	

(Optional) Alternative Actions/Solutions and Impacts
(No information provided)

Compliance codes: EXCL (CATEGORICAL EXCLUSION)

Explanation: 516 DM2 APP. 2, 1.6

Project Statement
Last Update: 09/14/96
Initial Proposal: 1994

CIRO-N-401.000
Priority: 999

Title: IDENTIFY INTERNAL & EXTERNAL VISTAS (VIEWSHEDS)

Funding Status: Funded: 0.00 Unfunded: 10.00

Servicewide Issues : C72 (PROTECTION)
N16 (NEAR-PARK DEV)
Cultural Resource Type: CULL (Cultural Landscape)
N-RMAP Program codes : I00 (Interp. of Natural Resource Issues)

10-238 Package Number :

Problem Statement

The establishing legislation for City of Rocks National Reserve (Public Law 100-696) recognizes scenic quality as a value requiring protection through management. The Comprehensive Management Plan further identifies the inventory of scenic resources (page 14) as one of the management objectives for aesthetic resources. The scenic and historic views associated with the reserve are important components that in a large measure define the visitor's experience. From the historical perspective, emigrants along the Claifornia Trail and the Salt Lake Alternate regarded City of Rocks as a landmark along these trails, as well as an oasis from the expansive and windy plains. Modern day visitors appreciate these same vistas not so much from a landmark along the journey, but as a unique location that provides a spectacular aesthetic experience.

Description of Recommended Project or Activity

Current Management Actions:

During the Comprehensive Management Planning (CMP) process the reserve's cultural, natural and scenic resources were surveyed and evaluated to provide a basis for zoning. Congress directed that the CMP should identify those areas or zones that would most appropriately be devoted to: (1) historic and natural preservation; (2) public use and development; and (3) private use subject to appropriate local ordinances designed to protect the historic rural setting. Two categories of important and exceptional resources were identified: cultural and visual, and natural and visual. Three important cultural vistas associated with the views experienced by the California Trail emigrants were identified and delineated (pages 105-107, CMP). Five superior and three excellent natural vistas were identified and delineated (pages 117-120, CMP) based upon scenic vista criteria found in the study, "Visual Resources Analysis" (NPS, 1990). These eight viewpoints were selected from 24 viewpoints analyzed within the reserve.

While there has been extensive study into identifying views and vistas within the reserve, there has been only one view identified outside the boundary. With the cooperation of surrounding Land Managers, reserve staff will expand its analysis of vistas over land adjacent to its boundary. Any vistas identified would be agreed upon by all parties involved. One area that would be a priority in this analysis is the BLM property near Almo that is identified for administrative use and visitor services.

OTHER RELATED PROJECTS

I-402.000 Restore and protect scenic qualities of vistas
 Nearly all Historic, Archeological, and Cultural/Historic Landscape
 project statements

BUDGET AND FTEs:

-----FUNDED-----				
Source	Activity	Fund Type	Budget (\$1000s)	FTEs
			=====	=====
Total:			0.00	0.00
-----UNFUNDED-----				
	Activity	Fund Type	Budget (\$1000s)	FTEs
Year 1:	RES	One-time	10.00	0.50
Total:			10.00	0.50

(Optional) Alternative Actions/Solutions and Impacts
 (No information provided)

Compliance codes: EXCL (CATEGORICAL EXCLUSION)

Explanation: 516 DM2 APP. 2, 1.6

Project Statement
Last Update: 02/05/97
Initial Proposal: 1994

CIRO-N-411.000
Priority: 999

Title: **ESTABLISH BASELINE AND MONITOR NATURAL QUIET**

Funding Status: Funded: 0.00 Unfunded: 13.00

Servicewide Issues : N20 (BASELINE DATA)
Cultural Resource Type: CULL (Cultural Landscape)
N-RMAP Program codes :

10-238 Package Number :

Problem Statement

When emigrants came through City of Rocks on the California Trail and the Salt Lake Alternate one of their consistant observations was to note the silence or natural quiet they experienced in this enclosed basin. Accordingly, one of the names of the area that persists to the present time is "Silent City of Rocks"; and this name is also used to describe the central pinnacle area of the reserve. Congress recognized this value when the reserve was created, hence the enabling legislation calls for protection of the silence of the landscape.

This value is recognized in other NPS units, particularly in federally designated wilderness areas. Managing for natural quiet in wilderness areas is helped by the fact that certain activities are prohibited in these areas, such as use of mechanized and motorized equipment and vehicles. Managing this value in what is essentially a frontcountry will present a unique challenge to reserve staff, especially since designating wilderness in the reserve is not currently an objective.

It is not the intent of the reserve to exclude humans from its definition of natural quiet, as they are a legitimate part of this landscape. However, it is the intent of the reserve to manage certain equipment brought in by visitors in order to achieve a level of natural quiet experienced by the emigrants on the trail. For example, battery-powered rock drills used in the sport of rock climbing have been banned from the reserve due in part to the amount of noise they created and thus the significant impact to the natural quiet of the area.

At the present time, the reserve does not have sufficient data to characterize the natural quiet. Before any further management actions are implemented baseline data will be collected.

Description of Recommended Project or Activity

It is proposed that the reserve will collect data on the natural quiet of the area. This data will be used to establish the current baseline of this resource and will evolve into a long-term monitoring program that will document any changes that may occur over time. A number of techniques will be used to document the existing conditions. One component will be to designate sampling stations throughout the reserve where decibel levels will be measured. These measurements will be taken at representative times during the day and at representative seasons of the year. At each station the source of the sound will be documented so that there can be differentiation between natural and equipment-based sound sources. This data will provide a range of sound levels from which the reserve can establish the sound ceiling that it desires to maintain.

Another component will be to develop and implement a visitor survey that would provide information on the degree to which visitors value natural quiet and how they judge or perceive a variety of sounds that would impact natural quiet. This information would be used to explore zoning areas of the reserve for different levels of natural quiet.

Restrictions on the use of various equipment would be implemented through interpretation and visitor education. If necessary it would be enforced by resource protection.

Other project statements will address contributing factors that affect natural quiet, such as firearm use and aircraft overflights.

BUDGET AND FTEs:

		-----FUNDED-----		
Source	Activity	Fund Type	Budget (\$1000s)	FTEs
Total:			0.00	0.00
		-----UNFUNDED-----		
	Activity	Fund Type	Budget (\$1000s)	FTEs
Year 1:	RES	One-time	9.00	0.40
	MON	Recurring	1.00	0.10
Subtotal:			10.00	0.50
Year 2:	MON	Recurring	1.00	0.10
Year 3:	MON	Recurring	1.00	0.10
Year 4:	MON	Recurring	1.00	0.10
Total:			13.00	0.80

(Optional) Alternative Actions/Solutions and Impacts
(No information provided)

Compliance codes: EXCL (CATEGORICAL EXCLUSION)

Explanation: 516 DM2 APP. 2, 1.6

Last Update: 07/06/96
Initial Proposal: 1994

Project Statement

CIRO-N-412.000
Priority: 999

Title: **MONITOR AIRCRAFT OVERFLIGHTS**

Funding Status: Funded: 0.00 Unfunded: 7.50

Servicewide Issues : N15 (AIRCRAFT OVRFLT)
Cultural Resource Type:
N-RMAP Program codes : A00 (Air Resources Management)
 A04 (Aircraft Overflights Management)

10-238 Package Number :

Problem Statement

Aircraft overflights and associated resource issues have been of concern at City of Rocks for many years. No direct impact to resources has been documented, however the noise impact is significant. The reserve is a pristine area of solitude, a resource that was identified in the reserve's establishing legislation, and the historical name of the area: the Silent City of Rocks. The problem also has safety aspects to it. The reserve is very popular for rock climbing and there have been incidents where climbers have almost fallen after being startled by military overflights.

The majority of low overflights are military training flights from Mountain Home Air Force Base, Hill Air Force Base, and National Guard units in Boise. There have been no efforts as of yet to minimize overflights through communication with military commanders. Experience at Craters of the Moon has shown that repeated efforts at communication are necessary to gain compliance.

The Federal Aviation Administration advisory of 2,000 AGL over wilderness and park areas applies to City of Rocks.

Description of Recommended Project or Activity

Two actions are recommended:

- (1) Establish communication with the military at Mountain Home, Hill and Boise to encourage changes in flight patterns; and
- (2) Establish a program for documentation of number and type of overflights.

OTHER RELATED PROJECTS

N-411.000 Establish baseline and monitor natural quiet

BUDGET AND FTEs:

		-----FUNDED-----		
Source	Activity	Fund Type	Budget (\$1000s)	FTEs
Total:			0.00	0.00
		-----UNFUNDED-----		
	Activity	Fund Type	Budget (\$1000s)	FTEs
Year 1:	MON	Recurring	1.50	0.10
	MIT	Recurring	1.50	0.10
Subtotal:			3.00	0.20
Year 2:	MON	Recurring	0.75	0.05
	MIT	Recurring	0.75	0.05
Subtotal:			1.50	0.10
Year 3:	MON	Recurring	0.75	0.05
	MIT	Recurring	0.75	0.05
Subtotal:			1.50	0.10
Year 4:	MON	Recurring	0.75	0.05
	MIT	Recurring	0.75	0.05
Subtotal:			1.50	0.10
Total:			7.50	0.50

(Optional) Alternative Actions/Solutions and Impacts
(No information provided)

Compliance codes: EXCL (CATEGORICAL EXCLUSION)

Explanation: 516 DM2 APP. 2, 1.6

Project Statement
Last Update: 07/06/96
Initial Proposal: 1994

CIRO-N-420.000
Priority: 999

Title: MONITOR WEATHER ON AN ELEVATIONAL GRADIENT

Funding Status: Funded: 0.00 Unfunded: 7.71

Servicewide Issues : N20 (BASELINE DATA)
 N14 (AIR POLLUTION)
Cultural Resource Type: CULL (Cultural Landscape)
N-RMAP Program codes : A00 (Air Resources Management)
 A03 (Meteorological Monitoring)

10-238 Package Number :

Problem Statement

Weather data is an important component of air quality, fire, other resource management programs, and visitor protection. Wind speed and direction provide information on source areas and transport behavior of air pollutants, dust and smoke. Other weather parameters, such as precipitation, relative and absolute humidity, and fuel moisture levels, are indicators of fire danger. Most of the Reserve is positioned in a hollowed landscape on the southeast flank of the Albion Range where the crest of the range obscures from view incoming weather changes. This places visitor safety at greater risk. Weather patterns observed in the Reserve show variation in wind speed, direction, and amount of rainfall and snow accumulation, with changes in topography and aspect. Snow accumulation and rainfall affect water supply for grazing allotments. Rainfall intensity and duration affects runoff rates and associated erosion; a significant problem in the Reserve because of the presence of coarse-grained granitic soils.

The nearest NOAA weather stations to the Reserve are in Oakley and Malta. Both stations are affected differently by local orographic behavior that does not accurately document weather at the Reserve. The Chief Ranger operates a manually recording weather station in his backyard, located a few miles east of the Reserve in the Almo Valley. The Chief Ranger currently monitors rainfall, high and low temperature, wind speed and direction, snow level, and visibility. Visibility is based on whether or not Cache Peak, the highest mountain in the Albion Range and eight miles distant, can be seen. These observations are usually made at 1:00 pm. The Reserve needs a series of weather stations at different elevations, and assorted portable instruments.

Description of Recommended Project or Activity

To accurately document weather patterns throughout the Reserve, weather stations need to be positioned at three strategic locations. A fourth weather station, located in the Almo Valley (elevation: 5300 feet), needs to be improved so that it continuously records weather. Recommended locations for the remote stations are: Graham Peak, the highest and northern-most point in the Reserve (elevation: 8867 feet); Bath Rock (elevation: 6600); and the stage station (elevation: 5916 feet). These three locations approximate a north-south transect at 3.5-mile intervals.

The fourth station, located in Almo Valley, is about 5.5 miles due east of Bath Rock. This station will be relocated to the visitor center, proposed in the Comprehensive Management Plan, and will be converted into an interactive weather exhibit.

Parameters to be measured at all stations include: rainfall, high and low temperature, wind speed and direction, and snow level. In addition, barometric pressure, visibility, dew point and fuel moisture will be monitored at the visitor center weather station.

Remote stations will be monitored monthly during the months of November through March, and weekly from April through October.

Equipment to be purchased:

Home Station: Weather Report, catalog number W2500 = \$1,279

3 Remote Stations:

Weather Service Instrument Shelter \$834 ea x 3	= \$2,502
Forestry-Type Range Gage, stand and stick \$330 x3	= 990
Wind Speed Dial #W3025 \$451 ea x 3	= 3,354
Max-Min Temp gage \$20 x 3	= 60
Bacharach Sling Psychrometer #W2100	= 76
Thommen Pocket Altimeter/Baramoter	= 230
Shipping, materials for installation	= 500
Total	= \$7,712

BUDGET AND FTEs:

-----FUNDED-----					
Source	Activity	Fund Type	Budget (\$1000s)	FTEs	
Total:			0.00	0.00	
-----UNFUNDED-----					
	Activity	Fund Type	Budget (\$1000s)	FTEs	
Year 1:	MON	One-time	7.71	0.10	
Total:			7.71	0.10	

(Optional) Alternative Actions/Solutions and Impacts
(No information provided)

Compliance codes: EXCL (CATEGORICAL EXCLUSION)

Explanation: 516 DM2 APP. 2, 1.6

Project Statement
Last Update: 01/31/97
Initial Proposal: 1994

CIRO-N-421.000
Priority: 10

Title: MONITOR AIR QUALITY FOR CLASS II PROTECTION

Funding Status: Funded: 0.00 Unfunded: 0.00

Servicewide Issues : N14 (AIR POLLUTION)
 N20 (BASELINE DATA)
Cultural Resource Type: CULL (Cultural Landscape)
N-RMAP Program codes : A00 (Air Resources Management)
 A02 (Air Quality Monitoring)

10-238 Package Number :

Problem Statement

City of Rocks has been designated a Class II area for air quality purposes of controlling increases in air pollution under the Clean Air Act. Due to the low population density and lack of large emission sources near the reserve, air quality is generally very good. Air quality data for the reserve has not been systematically collected, and since the few air quality monitoring stations in the region are located near known pollution sources, the data from these stations probably does not represent City of Rocks air. High particulate matter concentrations occur in the reserve when strong winds increase dust emissions from exposed soils in agricultural fields or on dirt roads. Smog can sometimes be seen near the reserve when prevailing winds carry pollution from nearby population centers.

Air quality in the west-central United States, including southern Idaho, generally has the best visual quality anywhere in the country (Sisler et al. 1993). Craters of the Moon National Monument, the closest NPS air monitoring site to the reserve, has more pristine visual air quality than any other NPS monitoring site in the continental United States. However, air quality monitoring data at Craters of the Moon show a trend in deterioration, with significant decreases in visibility in recent years (NPS 1991, Malm et al. 1994). The reserve's air quality might be deteriorating similarly, because City of Rocks is located near the same air pollution sources affecting Craters of the Moon. Even slight increases in air pollutants could cause major decreases in visibility.

Air quality is important for health, visitor enjoyment, scenic vistas, and preservation of natural systems and cultural resources. Most elements of a park environment are sensitive to air pollution. Notable air-quality-related values at City of Rocks are the visibility and the scenery.

Description of Recommended Project or Activity

Air quality monitoring will include establishing an air quality baseline and monitoring visibility and acid deposition.

OTHER RELATED PROJECTS:

N-400.000 Establish baseline and monitor the night sky
 N-401.000 Define scenic qualities
 N-402.000 Identify internal and external historic and scenic viewsheds
 I-403.000 Restore and protect scenic qualities of vistas
 N-422.000 Redesignate airshed to Class I protection
 N-431.000 Monitor air pollution impacts on aquatic resources
 N-432.000 Identify air pollution impacts on aquatic resources
 N-433.000 Establish long-term biological monitoring program

BUDGET AND FTEs:

-----FUNDED-----				
Source	Activity	Fund Type	Budget (\$1000s)	FTEs
			=====	=====
	Total:		0.00	0.00
-----UNFUNDED-----				
	Activity	Fund Type	Budget (\$1000s)	FTEs
			=====	=====
	Total:		0.00	0.00

(Optional) Alternative Actions/Solutions and Impacts
 (No information provided)

Compliance codes: EXCL (CATEGORICAL EXCLUSION)

Explanation: 516 DM2 APP. 2, 1.6

Project Statement
Last Update: 07/06/96
Initial Proposal: 1994

CIRO-N-421.001
Priority: 999

Title: **MONITOR AIR QUALITY FOR CLASS II PROTECTION**
Sub-title: **BASELINE AIR QUALITY**

Funding Status: Funded: 0.00 Unfunded: 0.00

Servicewide Issues : N14 (AIR POLLUTION)
 N20 (BASELINE DATA)
Cultural Resource Type: CULL (Cultural Landscape)
N-RMAP Program codes : A00 (Air Resources Management)
 A02 (Air Quality Monitoring)

10-238 Package Number :

Problem Statement

City of Rocks National Reserve is located in an area of the United States that has some of the nation's best air quality. Although it is generally agreed that the air quality in southern Idaho is relatively pristine, visibility data collected at Craters of the Moon National Monument in the 1980s indicated a significant trend of decreasing quality. Accordingly, since the reserve is in the same airshed, it is probable that it could be experiencing similar decreases.

Protection of air quality is mandated in public law 100-696 sec. 201.(a) which states "There is hereby established the City of Rocks National Reserve in order to...protect and maintain scenic quality;..." Air quality is a significant factor in how viewsheds are determined to be a "scenic". Currently, there is no air quality data being collected at the reserve. Baseline air quality data is essential to proper management.

Description of Recommended Project or Activity

Determine the frequency, duration and concentrations of ozone, nitrogen dioxide and sulfur dioxide. Determine whether levels of any of these pollutants are high enough to be considered phytotoxic. Integrated (non-continuous) sampling should be performed for sulfur dioxide and nitrogen dioxide. Meteorological monitoring should accompany these measurements. Wet deposition sampling using National Atmospheric Deposition Program / National Trends Network protocol should be considered. An analysis of data from existing monitoring stations located in the region should be performed prior to installation of new air quality monitoring stations.

Establish a monitoring site at the proposed CIRO visitor center / headquarters. A PREVENT particulate sampler (free-standing IMPROVE module A and possible module B) will also be located at that site.

NO ACTION ALTERNATIVE

Not monitoring air quality will prohibit the establishment of baseline or trend data on pollutants which have the potential to adversely impact the natural, cultural, and visual resources of City of Rocks.

OTHER RELATED PROJECTS
see N-421.000

BUDGET AND FTEs:

-----FUNDED-----				
Source	Activity	Fund Type	Budget (\$1000s)	FTEs
Total:			0.00	0.00
-----UNFUNDED-----				
	Activity	Fund Type	Budget (\$1000s)	FTEs
Total:			0.00	0.00

(Optional) Alternative Actions/Solutions and Impacts
(No information provided)

Compliance codes: EXCL (CATEGORICAL EXCLUSION)

Explanation: 516 DM2 APP. 2, 1.6

Project Statement
Last Update: 07/06/96
Initial Proposal: 1994

CIRO-N-421.002
Priority: 999

Title: **MONITOR AIR QUALITY FOR CLASS II PROTECTION**
Sub-title: **MONITOR VISIBILITY**

Funding Status: Funded: 0.00 Unfunded: 0.00

Servicewide Issues : N14 (AIR POLLUTION)
 N20 (BASELINE DATA)
Cultural Resource Type: CULL (Cultural Landscape)
N-RMAP Program codes : A00 (Air Resources Management)
 A02 (Air Quality Monitoring)

10-238 Package Number :

Problem Statement

Protecting and maintaining scenic quality was among the reasons for establishing City of Rocks National Reserve. Visibility monitoring is an important component of an air quality program. External threats justifying the need for an air quality program are addressed in the Comprehensive Management Plan for the Reserve. Preservation of air quality / visibility is necessary to protect historic and scenic viewsheds, and "to protect and maintain scenic quality" as mandated in the establishing legislation.

The Reserve does not have a visibility monitoring program at this time. However, data collected from Craters of the Moon National Monument which is in the same airshed as the Reserve can provide some background data. Information received from Air Resource Specialists in 1987 indicated the following seasonal 10-50-90 standard visual range values for Craters of the Moon:

Spring 1986	Summer 1986
10% = 104 km	10% = 69 km
50% = 167 km	50% = 124 km
90% = 270 km	90% = 222 km
Fall 1986	Winter 1987
10% = 115 km	10% = 96 km
50% = 201 km	50% = 212 km
90% = 391 km*	90% = 359 km

*theoretical mas.

Other data from Craters of the Moon indicate that the annual mean is relatively constant and that the annual maximum appears to fluctuate widely. Particulate data indicates that concentrations are highest in the summer months due to wind spread of soil particles.

Description of Recommended Project or Activity

Establish visibility monitoring to help protect airshed against visual degradation. Visibility will be monitored using automatic 35mm photographic equipment at a highly visited scenic vista. Fine particulates, such as sulfates and nitrates, will also be monitored at the camera site because they can seriously impair visibility and are precursors to acid deposition.

BUDGET AND FTEs:

-----FUNDED-----				
Source	Activity	Fund Type	Budget (\$1000s)	FTEs
Total:			0.00	0.00
-----UNFUNDED-----				
	Activity	Fund Type	Budget (\$1000s)	FTEs
Total:			0.00	0.00

(Optional) Alternative Actions/Solutions and Impacts
(No information provided)

Compliance codes: EXCL (CATEGORICAL EXCLUSION)

Explanation: 516 DM2 APP. 2, 1.6

Last Update: 07/06/96
Initial Proposal: 1994

Project Statement

CIRO-N-421.003
Priority: 999

Title: **MONITOR AIR QUALITY FOR CLASS II PROTECTION**
Sub-title: **MONITOR ACID DEPOSITION**

Funding Status: Funded: 0.00 Unfunded: 0.00

Servicewide Issues : N14 (AIR POLLUTION)
 N20 (BASELINE DATA)
Cultural Resource Type: CULL (Cultural Landscape)
N-RMAP Program codes : A00 (Air Resources Management)
 A02 (Air Quality Monitoring)

10-238 Package Number :

Problem Statement

As part of an integrated air and water quality monitoring program, City of Rocks National Reserve needs to include baseline information on acid deposition. The most practical course of action is to network with National Atmospheric Deposition Program (NADP) sites around City of Rocks.

Craters of the Moon has been an NADP sampling site since August 1980, and as such can provide some background data that could be extrapolated to the reserve. Analysis of Craters of the Moon precipitation data indicates no significant change in mean annual pH during the period from 1982 through 1987. During those years, the mean annual average pH fluctuated from 5.6 in 1987 to 5.8 in 1984. For 1989, the mean annual pH was 4.95 with a range from 4.01 to 6.59. This cursory evidence may point to an increase precipitation acidity.

There is currently no widely agreed upon definition of what pH is acidic for precipitation. The definition used in the past is that any readings below 5.6 pH constituted acid precipitation.

Specific conductance for 1989 averaged 4.27 with a range from 1.7 to 8.6.

Description of Recommended Project or Activity

Acquire and utilize NADP data.

OTHER RELATED PROJECTS:

CIRO-N-431.000 Monitor air pollution impacts on aquatic
resources

CIRO-N-432.000 Identify biological species sensitive to
pollutants

CIRO-N-433.000 Establish long-term biological monitoring program

BUDGET AND FTEs:

-----FUNDED-----					
Source	Activity	Fund Type	Budget (\$1000s)	FTEs	
			=====	=====	
Total:			0.00	0.00	
-----UNFUNDED-----					
	Activity	Fund Type	Budget (\$1000s)	FTEs	
			=====	=====	
Total:			0.00	0.00	

(Optional) Alternative Actions/Solutions and Impacts
(No information provided)

Compliance codes: EXCL (CATEGORICAL EXCLUSION)

Explanation: 516 DM2 APP. 2, 1.6

Project Statement
Last Update: 11/19/96
Initial Proposal: 1994

CIRO-N-422.000
Priority: 999

Title: **REDESIGNATE AIRSHED TO CLASS I PROTECTION**

Funding Status: Funded: 0.00 Unfunded: 0.00

Servicewide Issues : N14 (AIR POLLUTION)
Cultural Resource Type: CULL (Cultural Landscape)
N-RMAP Program codes : A00 (Air Resources Management)
 A01 (Air Quality Management)

10-238 Package Number :

Problem Statement

The Comprehensive Management Plan for the reserve identifies the following as one of the objectives for natural resource management: "Protect air quality at the highest level possible under the Clean Air Act by working cooperatively with the state of Idaho to redesignate the area from Class I to Class II" (page 14). The Clean Air Act (42 USC 7401 et. seq.) provides the primary authority for protecting and enhancing the nation's air quality, visibility, and preventing significant deterioration of air quality in clean air areas of the United States. The primary federal responsibility under the act is to provide technical and financial assistance to state and local governments who have the responsibility to develop and execute air pollution prevention and control programs. The act and companion regulations influence management by requiring consideration of any action which might change the air quality levels. The Clean Air Act (CAA) established three classifications of varying degrees of restriction of allowable air quality deterioration in clean air areas. Forty-eight NPS units are designated as mandatory class I areas, where very little additional air pollution is permitted. City of Rocks is designated class II, along with most other NPS units. No areas of the country are class III as of now. The three classifications set different maximum allowable increases (increments) beyond baseline levels of three air pollutants; sulfur dioxide, nitrogen dioxide, and particulate matter. Class I increments are the most stringent, followed by class II and III. The CAA gives the Superintendent of a class I area and the Federal Land Manager (the Assistant Secretary of the Interior for Fish and Wildlife and Parks) an affirmative responsibility to protect the air quality-related values of the area from adverse air pollution impacts. Air quality-related values (AQRVs) include visibility, plants, animals, soils, water quality, historic and cultural objects and structures, public health, and any other natural or cultural resource susceptible to air pollution damage. The Superintendent and the Federal Land Manager are given a clear role in the permit review process for major new or modified sources planning to locate near a

class I area, including the authority to recommend denial of a permit if adverse impacts on AQRVs are likely to result if the source were constructed. Because City of Rocks is a class II area, it does not have these same resource protection measures. Current concentrations of air pollutants (ozone, sulfur dioxide, nitrogen dioxide, fluorides, and trace metals) are unknown in the park. The potential for increased pollution levels in the future due to increased agriculture, coal-fired power production, and population growth in nearby areas of Idaho, Utah and Nevada, necessitate monitoring the quality of the air to determine present levels and establish baseline for future changes. Currently, there is no air quality data being collected from the park, and concentrations of air pollutants (ozone, sulfur dioxide, nitrogen dioxide, fluorides, and trace metals) are unknown.

Description of Recommended Project or Activity

City of Rocks, a Class II designated area, is between Craters of the Moon National Monument and Great Basin National Park. Both of these NPS units are designated as Class I areas for air quality purposes. Redesignation of City of Rocks for Class I protection should be pursued. The decision for redesignation lies with the State of Idaho. Technical assistance for the redesignation procedure will be requested from NPS air quality specialists within the field area and WASO Air Quality Division.

OTHER RELATED PROJECTS

- N-400.000 Establish baseline and monitor the night sky
- N-401.000 Define scenic qualities
- N-402.000 Identify internal and external vistas
- N-420.000 Monitor weather on an elevational gradient
- N-421.000 Monitor air quality for Class II protection
- N-431.000 Monitor air pollution impacts on aquatic resources
- N-432.000 Identify biological species sensitive to pollutants
- N-433.000 Establish long-term biological monitoring program

BUDGET AND FTEs:

-----FUNDED-----					
Source	Activity	Fund Type	Budget (\$1000s)	FTEs	
			=====		
Total:			0.00	0.00	
-----UNFUNDED-----					
	Activity	Fund Type	Budget (\$1000s)	FTEs	
			=====		
Total:			0.00	0.00	

(Optional) Alternative Actions/Solutions and Impacts
(No information provided)

Compliance codes: EXCL (CATEGORICAL EXCLUSION)

Explanation: 516 DM2 APP. 2, 1.9

Project Statement
Last Update: 11/19/96
Initial Proposal: 1994

CIRO-N-440.000
Priority: 999

Title: PRODUCE A SUITE OF GEOLOGIC RESOURCE MAPS

Funding Status: Funded: 0.00 Unfunded: 0.00

Servicewide Issues : N20 (BASELINE DATA)
 N22 (VIS USE-DEV ZN)
Cultural Resource Type: CULL (Cultural Landscape)
N-RMAP Program codes : G00 (Geologic Resources Management)

10-238 Package Number :

Problem Statement

City of Rocks National Reserve is located in the southern Albion Range of south-central Idaho. This range is one of approximately two dozen metamorphic core complexes identified in the North American Cordilleran. In the Reserve the intruded relationship of the Tertiary Almo pluton (quartz monzonite) into Precambrian gneisses can be seen. Granular disintegration and erosion of the pluton have created a hollowed landscape within the mountain range, which pioneers traveling west on the California trail appropriately named "Circle Creek Basin." Pressure unloading-induced exfoliation has shaped a maze of grussic granitic and gneissic spires within the encircling basin, the bases of which are buried in coarse sand. Soil development is poor. Cattle trails, social trails and roads have disturbed and diminished an already open cover of vegetation. Plant communities have changed dramatically over the past 150 years due to various land-uses, agricultural and otherwise. These changes have made it easier for erosion to mark the landscape, as it now is in the form of gullies and outwash fans.

The geologic resources and associated physical processes of City of Rocks are the primary significant resource affecting all other resource values in the Reserve. The geology of City of Rocks is identified as the second highest interpretive priority in the Comprehensive Management Plan, second only to the California Trail corridor. Yet it is the landscape that provides the unique significance to this segment of the California Trail. The landscape encompasses an array of granitic spires, some of which include major landmarks along the California Trail and signatures of pioneers. These granitic pinnacles are also popular among climbers, provide a diversity of sheltered habitat for wildlife and raptors, and influence soil development and vegetation. **Effective cultural and natural resource stewardship and management of recreation, such as designing a trail system to fit the terrain, and relocate and engineer road segments, depends upon knowledge and understanding of the geologic and soil resources and the physical processes affecting**

them.

Although geology students enrolled in university field courses, master's candidates and doctoral candidates have mapped in this area, no professional geologic map has ever been published. A GIS-compatible geologic map, mapped in the field at the 1:24,000 scale, is needed as part of the Reserve's natural resource database. Before his untimely death, Dr. Richard Armstrong (University of British Columbia), had completed geological field work in the Albion Range (late 1970's). His field maps remain on repository with the USGS in Menlo Park, CA and would be an appropriate starting point for producing a functional map for resource management. Armstrong's maps should be field checked by a qualified field geologist, and possibly one familiar with Armstrong's work and/or the geology of the Albion, Raft River, Grouse Creek mountain ranges of Idaho and Utah. (The literature indicates that these three ranges have often been studied in unison.) In addition to field checking the bedrock map, Quaternary geology should also be mapped in relationship to bedrock and inventoried for diverse engineering attributes, since the dynamics of surface processes is an ongoing resource management and safety concern.

Bedrock and Quaternary geologic maps are the foundation for other resource maps that will be directly useable by Reserve managers for resource stewardship decisions. These identified needed maps include a landform map delineating the location and position of pinnacles to aid in resource management (wildlife habitat; cultural resources) and search and rescue operations. The pinnacle area of the Reserve is where climbers concentrate, and the maze-like distribution of pinnacles leads to easy disorientation for those unfamiliar with the terrain. An inventory and assessment of fragile rock formations is needed to help Reserve staff manage recreational activities in an appropriate way to protect these features. A terrain analysis map identifying areas susceptible to erosion and deposition will provide Reserve managers with information needed for planning, safety and land-use decisions.

Description of Recommended Project or Activity

The following 6 sub-projects address acquiring the geologic data base needs for managing geologic resources and their associated resource problems:

- N-440.001 Field check unpublished bedrock geologic map
- N-440.002 Map Quaternary geology
- N-440.003 Map landforms
- N-440.004 Inventory fragile rock formations
- N-440.005 Produce terrain analysis map
- N-440.006 Train Reserve staff

RELATED PROJECTS FROM RESOURCES MANAGMENT PLAN:

I-080.000 Develop and maintain geographic information system
 I-333.005 Rehabilitate eroded areas as appropriate (CA Trail)
 I-450.000 Control soil erosion and sedimentation
 N-460.000 Rehabilitate eroded areas
 I-461.000 Develop a road removal and rehabilitation plan
 N-800.000 Interpret resource management issues
 N-822.000 Develop a trail management plan

BUDGET AND FTEs:

-----FUNDED-----				
Source	Activity	Fund Type	Budget (\$1000s)	FTEs
Total:			0.00	0.00
-----UNFUNDED-----				
	Activity	Fund Type	Budget (\$1000s)	FTEs
Total:			0.00	0.00

(Optional) Alternative Actions/Solutions and Impacts
 (No information provided)

Compliance codes: EXCL (CATEGORICAL EXCLUSION)

Explanation: 516 DM6 APP. 7.4 E

Project Statement
Last Update: 02/03/97
Initial Proposal: 1994

CIRO-N-440.001
Priority: 1

Title: **PRODUCE A SUITE OF GEOLOGIC RESOURCE MAPS**
Sub-title: **FIELD CHECK UNPUBLISHED BEDROCK GEOLOGIC MAP**

Funding Status: Funded: 0.00 Unfunded: 9.00

Servicewide Issues : N20 (BASELINE DATA)
N22 (VIS USE-DEV ZN)
Cultural Resource Type: CULL (Cultural Landscape)
N-RMAP Program codes : G00 (Geologic Resources Management)

10-238 Package Number :

Problem Statement

Refer to N-440.000 for a description of the problem.

Description of Recommended Project or Activity

Field check bedrock geology mapped by Richard Armstrong (deceased) during the late 1970's. A qualified field geologist experienced in Basin and Range geology has been identified and is willing to do this work. Field checking will include assessment for agreement with current state of knowledge and understanding of the tectonic setting of the Basin and Range acquired since the time of Richard Armstrong. Field assistance will be provided by the cluster geologist located in the Columbia-Cascades SSO. GPS will be used to fix the location of bedrock contacts.

Bedrock geology will be included as a layer in the Reserve's GIS-database. GIS-format digitized geologic map will be at a 1:24,000 scale and encompass the primary structural setting of the Reserve. This map should include, but not be limited by the boundaries of three of partially overlapping federal designations: the National Reserve, National Historic Landmark and National Natural Landmark. At a minimum, this will include all of the Almo quadrangle, and parts of the Cache Peak, Lyman Pass and Basin quadrangles. A metadata file consistent with FGDC Metadata Standards, along with a copy of each data set in ARC-INFO format, will be produced.

RELATED PROJECTS FROM RESOURCES MANAGEMENT PLAN

CIRO-N-450.000 Study slope stability
 CIRO-N-451.000 Control soil erosion and sedimentation
 CIRO-N-452.000 Interpret geologic features and processes
 CIRO-N-460.000 Rehabilitate eroded areas
 CIRO-N-842.000 Develop a Trails Management Plan

BUDGET AND FTEs:

-----FUNDED-----				
Source	Activity	Fund Type	Budget (\$1000s)	FTEs
			=====	=====
Total:			0.00	0.00
-----UNFUNDED-----				
	Activity	Fund Type	Budget (\$1000s)	FTEs
Year 1:	RES	One-time	9.00	0.15
Total:			9.00	0.15

(Optional) Alternative Actions/Solutions and Impacts
 (No information provided)

Compliance codes: EXCL (CATEGORICAL EXCLUSION)

Explanation: 516 DM2 APP. 2, 1.6

Project Statement
Last Update: 12/20/96
Initial Proposal: 1994

CIRO-N-440.002
Priority: 1

Title: **PRODUCE A SUITE OF GEOLOGIC RESOURCE MAPS**
Sub-title: **MAP QUATERNARY GEOLOGY**

Funding Status: Funded: 0.00 Unfunded: 9.00

Servicewide Issues : N20 (BASELINE DATA)
N22 (VIS USE-DEV ZN)
Cultural Resource Type: CULL (Cultural Landscape)
N-RMAP Program codes :

10-238 Package Number :

Problem Statement

Refer to N-440.000 for a description of the problem.

Description of Recommended Project or Activity

Field checking of Armstrong's work (CIRO-N-440.001) will include inventory of supplemental Quaternary information: mapping of Holocene, young Pleistocene, and old Pleistocene geology, and identifying distinguishing physical attributes of these units, such as swelling clays, caliche horizons and erodability. Quaternary data will be included as a layer in GIS. A metadata file consistent with FGDC Metadata Standards, along with a copy of each data set in ARC-INFO format, will be produced.

BUDGET AND FTEs:

		-----FUNDED-----		
Source	Activity	Fund Type	Budget (\$1000s)	FTEs
Total:			0.00	0.00
		-----UNFUNDED-----		
	Activity	Fund Type	Budget (\$1000s)	FTEs
Year 1:	RES	One-time	9.00	0.15
Total:			9.00	0.15

(Optional) Alternative Actions/Solutions and Impacts
(No information provided)

Compliance codes: EXCL (CATEGORICAL EXCLUSION)

Explanation: 516 DM2 APP. 2, 1.6

Project Statement
Last Update: 12/20/96
Initial Proposal: 1994

CIRO-N-440.003
Priority: 1

Title: **PRODUCE A SUITE OF GEOLOGIC RESOURCE MAPS**
Sub-title: **MAP LANDFORMS**

Funding Status: Funded: 0.00 Unfunded: 28.50

Service-wide Issues : N20 (BASELINE DATA)
 N22 (VIS USE-DEV ZN)
Cultural Resource Type: CULL (Cultural Landscape)
N-RMAP Program codes : G00 (Geologic Resources Management)

10-238 Package Number :

Problem Statement

Refer to N-440.000 for a description of the problem.

Description of Recommended Project or Activity

Produce a detailed inventory map in GIS-format of discrete pinnacles via interpretation of aerial photographs using National Aerial Photography Program [NAPP] or new photography. Map scale should be 1:5,000. Pinnacles formed from the Almo pluton will be distinguished from those formed in the Green Creek gneiss. Field proofing will be necessary to accomplish this. A metadata file consistent with FGDC Metadata Standards, along with a copy of each data set in ARC-INFO format, will be produced. This map will be of great value for resource management (wildlife habitat; cultural resources) and during search and rescue operations.

BUDGET AND FTEs:

-----FUNDED-----				
Source	Activity	Fund Type	Budget (\$1000s)	FTEs
			=====	=====
Total:			0.00	0.00
-----UNFUNDED-----				
	Activity	Fund Type	Budget (\$1000s)	FTEs
Year 1:	RES	One-time	28.50	0.10
Total:			28.50	0.10

(Optional) Alternative Actions/Solutions and Impacts
(No information provided)

Compliance codes: EXCL (CATEGORICAL EXCLUSION)

Explanation: 516 DM2 APP. 2, 1.6

Project Statement
Last Update: 12/20/96
Initial Proposal: 1994

CIRO-N-440.004
Priority: 1

Title: **PRODUCE A SUITE OF GEOLOGIC RESOURCE MAPS**
Sub-title: **INVENTORY FRAGILE ROCKS**

Funding Status: Funded: 0.00 Unfunded: 7.50

Service-wide Issues : N20 (BASELINE DATA)
 N22 (VIS USE-DEV ZN)
Cultural Resource Type: CULL (Cultural Landscape)
N-RMAP Program codes : G00 (Geologic Resources Management)

10-238 Package Number :

Problem Statement

Refer to N-440.000 for a description of the problem.

Description of Recommended Project or Activity

Assess and inventory fragile rock formations while field checking the inventory map of pinnacles (N-440.003). Evaluation criteria will need to be developed. Field evaluations will be documented in writing and as a text file included as an attribute of the features in the pinnacles data layer.

BUDGET AND FTEs:

-----FUNDED-----				
Source	Activity	Fund Type	Budget (\$1000s)	FTEs
			=====	=====
Total:			0.00	0.00
-----UNFUNDED-----				
	Activity	Fund Type	Budget (\$1000s)	FTEs
Year 1:	RES	One-time	7.50	0.10
Total:			7.50	0.10

(Optional) Alternative Actions/Solutions and Impacts
(No information provided)

Compliance codes: EXCL (CATEGORICAL EXCLUSION)

Explanation: 516 DM2 APP. 2, 1.6

Project Statement
Last Update: 12/20/96
Initial Proposal: 1994

CIRO-N-440.005
Priority: 1

Title: **PRODUCE A SUITE OF GEOLOGIC RESOURCE MAPS**
Sub-title: **MAKE TERRAIN ANALYSIS MAP**

Funding Status: Funded: 0.00 Unfunded: 9.00

Servicewide Issues : N20 (BASELINE DATA)
N22 (VIS USE-DEV ZN)
Cultural Resource Type: CULL (Cultural Landscape)
N-RMAP Program codes : D00 (Disturbed Area Rehabilitation)

10-238 Package Number :

Problem Statement

Refer to N-440.000 for a description of the problem.

Description of Recommended Project or Activity

Produce a terrain analysis map in GIS-format which identifies areas of high, moderate and low erodability, and high, moderate and low deposition. This analysis will be based on the preceding four subprojects and Digital Elevation Modeling (DEM). A metadata file consistent with FGDC Metadata Standards, along with a copy of each data set in ARC-INFO format, will be produced. A report will explain the criteria of evaluation, summarize the findings, and discuss the physiographic dynamics of the Reserve.

BUDGET AND FTEs:

-----FUNDED-----				
Source	Activity	Fund Type	Budget (\$1000s)	FTEs
Total:			0.00	0.00
-----UNFUNDED-----				
	Activity	Fund Type	Budget (\$1000s)	FTEs
Year 1:	RES	One-time	9.00	0.10
Total:			9.00	0.10

(Optional) Alternative Actions/Solutions and Impacts
(No information provided)

Compliance codes: EXCL (CATEGORICAL EXCLUSION)

Explanation: 516 DM2 APP. 2, 1.6

Project Statement **CIRO-N-440.006**
Last Update: 01/02/97 Priority: 1
Initial Proposal: 1994

Title: **PRODUCE A SUITE OF GEOLOGIC RESOURCE MAPS**
Sub-title: **TRAIN STAFF ON RESERVE GEOLOGY AND SURFICIAL PROCESSES**

Funding Status: Funded: 0.00 Unfunded: 1.00

Service-wide Issues : N20 (BASELINE DATA)
N22 (VIS USE-DEV ZN)
Cultural Resource Type: CULL (Cultural Landscape)
N-RMAP Program codes :

10-238 Package Number :

Problem Statement

Refer to N-440.000 for a description of the problem.

Description of Recommended Project or Activity

Present a minimum of two training seminars for Reserve staff. Each seminar should be presented at the Reserve. The first seminar should focus on the geology and physical processes characteristic of the Reserve, and can be presented during the field session of one of the preceding subprojects. The second, or last, seminar will present the findings of the entire project and include implications for resource stewardship and utility in management planning to minimize maintenance activity related to recurring erosion and deposition problems.

BUDGET AND FTEs:

-----FUNDED-----				
Source	Activity	Fund Type	Budget (\$1000s)	FTEs
Total:			0.00	0.00
-----UNFUNDED-----				
	Activity	Fund Type	Budget (\$1000s)	FTEs
Year 1:	ADM	One-time	1.00	0.05
Total:			1.00	0.05

(Optional) Alternative Actions/Solutions and Impacts
(No information provided)

Compliance codes: EXCL (CATEGORICAL EXCLUSION)

Explanation: 516 DM6 APP. 7.4 E(2)

Project Statement
Last Update: 09/02/96
Initial Proposal: 1994

CIRO-N-500.000
Priority: 999

Title: DEVELOP A WATER RESOURCES MANAGEMENT PLAN

Funding Status: Funded: 0.00 Unfunded: 70.00

Servicewide Issues : N11 (WATER QUAL-EXT)
 N12 (WATER FLOW)

Cultural Resource Type:
N-RMAP Program codes :

10-238 Package Number :

Problem Statement

City of Rocks is a relatively new NPS area, established in 1988. Water resources information is limited concerning floodplains and wetlands, water quality and quantity, water rights issues, biotic resources, classification of streams, stream characterization and water uses. Water is a major ecological component and political, socio-economic concern. More information is needed to enable management to address present and future water resources issues.

Description of Recommended Project or Activity

The following work is best accomplished as a consolidated effort because it is more efficient and allows management to consider cumulative and cultural impacts:

1. Determine baseline water quality in streams and springs;
2. Determine baseline water quality in ground water;
3. Determine baseline surface water flows;
4. Determine baseline ground water levels and flows;
5. Inventory aquatic flora and fauna;
6. Survey and map floodplains and wetlands;
7. Determine water uses and status of water rights;
8. Classify streams;
9. Compile and present background information on water resources, issues, concerns, and needs;
10. Compile, synthesize, and present information to characterize the hydrology of the reserve and to describe the current condition and status of water resources;
11. Develop project statements that describe activities necessary to address the water resources issues; and
12. Design an efficient, strategic long-term water resource monitoring plan to address issues.

Funding (\$70K) is needed to conduct a water resources study and develop a water Resources Management Plan (WMP). This effort can be accomplished through a cooperative parks study unit such as Oregon state University, or with a technical assistance request to the NPS Water Resources Division. This project should also include the development of project statements for future management of water resources, and design of water quality monitoring methods.

BUDGET AND FTEs:

-----FUNDED-----				
Source	Activity	Fund Type	Budget (\$1000s)	FTEs
Total:			0.00	0.00
-----UNFUNDED-----				
	Activity	Fund Type	Budget (\$1000s)	FTEs
Year 1:	RES	One-time	25.00	0.00
Year 2:	RES	One-time	25.00	0.00
Year 3:	RES	One-time	20.00	0.00
Total:			70.00	0.00

(Optional) Alternative Actions/Solutions and Impacts

No Action: If the WMP is not completed, the reserve will lack important water resource information.

Compliance codes: EXCL (CATEGORICAL EXCLUSION)

Explanation: 516 DM2 APP. 2, 1.6

Project Statement

CIRO-N-500.004
Priority: 999

Last Update: 11/19/96
Initial Proposal: 1994

Title: **DEVELOP A WATER RESOURCES MANAGEMENT PLAN**
Sub-title: **INVENTORY AQUATIC RES.**

Funding Status: Funded: 0.00 Unfunded: 0.00

Servicewide Issues : N14 (AIR POLLUTION)
 N16 (NEAR-PARK DEV)

Cultural Resource Type:
N-RMAP Program codes :

10-238 Package Number :

Problem Statement

The aquatic biota in the streams, ponds, and springs at City of Rocks National Reserve is relatively unknown. The historic use and manipulations by humans has altered the habitat and probably caused a decline in biodiversity. If current management can effectively institute the federal land management riparian standards for livestock grazing, the aquatic flora and fauna will definitely benefit. The riparian habitat is the most biologically productive and sensitive in the Great Basin physiographic region. The kinds of plants and wildlife inhabiting this biologically rich area include: various zooplankton and phytoplankton, numerous insects and other arthropods, amphibians, and fish.

The NPS and Idaho Department of Parks and Recreation are required to maintain as near pristine water quality as possible within the reserve under provisions of the NPS Organic Act of 1916, enabling legislation for the reserve (PL 100-696, Title II), NPS Management Policies (1989), the Federal Safe Drinking water Act of 1974, and Idaho Department of Ecology water quality criteria for non-potable waters.

Description of Recommended Project or Activity

After determining the physical and chemical component of aquatic environments, an inventory of their flora and fauna will establish an important baseline and foundation for future long-term monitoring. The EPA Rapid Bioassessment Protocols for monitoring are the most cost effective method.

This inventory will give managers an immediate indication of the overall condition of the natural resource. Sampling will include crustacean zooplankton and rotifers, phytoplankton, benthic macroinvertebrates, amphibians, and fish. If bird and bat species

were include it would provide a valuable link to terrestrial biodiversity and an assessment of overall ecological "health" as well. (Using mist nets at night over riparian areas is an excellent method of determining the number of bat species and their relative populations).

As land management practices change over time, aquatic flora and fauna will provide the best indicators for evaluating that change whether the management action was on terrestrial or aquatic resources. the aquatic system integrates the cumulative effects relatively fast at detectable levels for future monitoring; reference CIRO-N-400.007 Developing a Long-Term water Monitoring Strategy.

BUDGET AND FTEs:

-----FUNDED-----				
Source	Activity	Fund Type	Budget (\$1000s)	FTEs
			=====	=====
Total:			0.00	0.00
-----UNFUNDED-----				
	Activity	Fund Type	Budget (\$1000s)	FTEs
			=====	=====
Total:			0.00	0.00

(Optional) Alternative Actions/Solutions and Impacts
(No information provided)

Compliance codes: EXCL (CATEGORICAL EXCLUSION)

Explanation: 516 DM2 APP. 2, 1.6

Project Statement **CIRO-N-600.000**
Last Update: 09/02/96 Priority: 999
Initial Proposal: 1994

Title: DEVELOP A VASCULAR PLANT SPECIES COLLECTION: NATIVE

Funding Status: Funded: 0.00 Unfunded: 0.00

Servicewide Issues : N20 (BASELINE DATA)
 : N17 (BIODIVERSITY)

Cultural Resource Type:
N-RMAP Program codes :

10-238 Package Number :

Problem Statement

One of the primary resources of the reserve is vegetation. Nearly every visitor use, scientific study, management activity, and facility development has the potential to effect this resource. Development of a vascular plant species collection is basic to nearly all plans and actions within the reserve. This information must be surveyed, collected, retained, and made accessible to managers, resource specialists and partners (i.e. landowners, Idaho Department of Parks and Recreation, Idaho Department of Fish and Game, USFS, BLM and the educational institutions).

Description of Recommended Project or Activity

To accomplish this umbrella project, three sub-projects are called for:

CIRO-N-603.001 Complete a vascular plant species list
CIRO-N-603.002 Purchase herbarium storage and retrieval
 equipment
CIRO-N-603.003 Train reserve's natural resource specialist

For details, refer to each.

BUDGET AND FTEs:

-----FUNDED-----				
Source	Activity	Fund Type	Budget (\$1000s)	FTEs
Total:			0.00	0.00
-----UNFUNDED-----				
	Activity	Fund Type	Budget (\$1000s)	FTEs
Total:			0.00	0.00

(Optional) Alternative Actions/Solutions and Impacts

Without this baseline data, and the ability to access it on demand, managers are unnecessarily burdened in their duty to plan and protect resources efficiently.

Compliance codes: EXCL (CATEGORICAL EXCLUSION)

Explanation: 516 DM2 APP. 2, 1.6

Project Statement
Last Update: 01/08/97
Initial Proposal: 1994

CIRO-N-600.001
Priority: 4

Title: **DEVELOP A VASCULAR PLANT SPECIES COLLECTION**
Sub-title: **COMPLETE VEG SPECIES LIST**

Funding Status: Funded: 0.00 Unfunded: 24.00

Servicewide Issues : N20 (BASELINE DATA)
N17 (BIODIVERSITY)

Cultural Resource Type:
N-RMAP Program codes :

10-238 Package Number :

Problem Statement

All lands within the reserve, and in some cases adjacent lands which have potential for inclusion into the reserve, need to be systematically surveyed for all species of vascular plants, to serve as the basis for a wide variety of activities including visitor use planning, wildlife studies, survey of rare or sensitive species, and facility development.

Description of Recommended Project or Activity

A botanist approved by and under the direction of Idaho State University will systematically survey the reserve, make a list of species encountered, collect three specimens of each, press, and catalog into three separate herbariums: (1) Idaho State University (2) Utah State University, and (3) City of Rocks National Reserve. At the completion of the survey, the list will be compiled into an inventory document to be kept in perpetuity at the reserve.

One botanist will require 2 8-hour visits per week during the months of April through September for three years.

2 days x 26 weeks x 3 years = 156 man/days = .6 FTE

Related projects include:

CIRO-N-603.002 Purchase storage equipment
CIRO-N-603.003 Train Reserve staff

BUDGET AND FTEs:

-----FUNDED-----				
Source	Activity	Fund Type	Budget (\$1000s)	FTEs
Total:			0.00	0.00
-----UNFUNDED-----				
	Activity	Fund Type	Budget (\$1000s)	FTEs
Year 1:	RES	Recurring	8.00	0.20
Year 2:	RES	Recurring	8.00	0.20
Year 3:	RES	Recurring	8.00	0.20
Total:			24.00	0.60

(Optional) Alternative Actions/Solutions and Impacts
(No information provided)

Compliance codes: EXCL (CATEGORICAL EXCLUSION)

Explanation: 516 DM2 APP. 2, 1.6

Project Statement
Last Update: 01/02/97
Initial Proposal: 1994

CIRO-N-600.002
Priority: 4

Title: **DEVELOP A VASCULAR PLANT SPECIES COLLECTION**
Sub-title: **PURCHASE HERBARIUM EQUIPMNT**

Funding Status: Funded: 0.00 Unfunded: 3.60

Servicewide Issues : N20 (BASELINE DATA)
 N24 (OTHER (NATURAL))

Cultural Resource Type:
N-RMAP Program codes :

10-238 Package Number :

Problem Statement

In order to retain the vascular plant collection at CIRO and to have it readily available for reference by natural resource personnel and reserve managers, a proper storage facility is required.

Description of Recommended Project or Activity

Recommended actions include the following: purchase herbarium cabinet capable of containing a minimum of 600 specimens; purchase a binocular scope for examining specimens; and purchase associated materials used to mount additions to the herbarium or remount specimens in disrepair. The botanist who completed the vascular plant species list will spend three days to establish the collection retainment system.

Herbarium case/shipping	= \$2,500
mounting supplies	= 100
stereomicroscope	= 700
3 days labor/cost	= 300
total	= \$3,600

Related projects include:

CIRO-N-603.001 Complete a vascular plant species list
 CIRO-N-603.003 Train reserve staff
 CIRO-C-251.000 Catalog museum collections
 CIRO-C-252.000 Research and collect materials from non-NPS
 collections
 CIRO-I-255.000 Identify and document natural history specimens
 CIRO-C-281.000 Develop collections storage plan
 CIRO-C-282.000 Purchase museum storage & security equipment

BUDGET AND FTEs:

		-----FUNDED-----		
Source	Activity	Fund Type	Budget (\$1000s)	FTEs
			=====	=====
		Total:	0.00	0.00
		-----UNFUNDED-----		
	Activity	Fund Type	Budget (\$1000s)	FTEs
Year 1:	PRO	One-time	3.60	0.02
		Total:	3.60	0.02

(Optional) Alternative Actions/Solutions and Impacts
 (No information provided)

Compliance codes: EXCL (CATEGORICAL EXCLUSION)

Explanation: 516 DM2 APP. 2, 1.6

Project Statement
Last Update: 02/06/97
Initial Proposal: 1994

CIRO-N-600.003
Priority: 4

Title: **DEVELOP A VASCULAR PLANT SPECIES COLLECTION**
Sub-title: **TRAIN RESERVE'S NR STAFF**

Funding Status: Funded: 0.00 Unfunded: 1.20

Servicewide Issues : N24 (OTHER (NATURAL))
Cultural Resource Type:
N-RMAP Program codes :

10-238 Package Number :

Problem Statement

For the vascular plant species collection to be of value to the reserve's natural resource staff and managers, the botanist will train staff to properly retrieve herbarium information, as well as make additions, monitor and repair/replace specimens collected. Initially, natural resource personnel will need to make site visits with the botanist to discovered locations of rare, sensitive or unusual colonies of vascular plants found within the reserve.

Description of Recommended Project or Activity

The botanist who conducted the original study will make site visits with natural resource staff to locations of rare, sensitive or unusual vascular plant communities. This botanist will train staff on proper retrieval, storage and accession of herbarium information.

Including travel, the botanist will require 5 days to train staff.

Transportation	=	\$140
Lodging	=	\$220
Salary	=	\$800
Miscellaneous	=	40
Total	=	\$1,200

Related projects:

CIRO-N-603.000 Develop a vascular plant species collection
CIRO-N-603.001 Complete a vascular plant species list
CIRO-N-603.002 Purchase storage equipment

BUDGET AND FTEs:

		-----FUNDED-----		
Source	Activity	Fund Type	Budget (\$1000s)	FTEs
Total:			0.00	0.00
		-----UNFUNDED-----		
	Activity	Fund Type	Budget (\$1000s)	FTEs
Year 1:	INT	One-time	1.20	0.02
Total:			1.20	0.02

(Optional) Alternative Actions/Solutions and Impacts
(No information provided)

Compliance codes: EXCL (CATEGORICAL EXCLUSION)

Explanation: 516 DM2 APP. 2, 1.11

Last Update: 09/02/96
Initial Proposal: 1994

Project Statement

CIRO-N-620.000
Priority: 999

Title: **SURVEY AND MAP DISTRIBUTION OF NON-NATIVE PLANTS (see IPM)**

Funding Status: Funded: 5.00 Unfunded: 16.00

Servicewide Issues : N05 (NON-NAT PLANTS)
 N20 (BASELINE DATA)
Cultural Resource Type: COMB (Combination)
N-RMAP Program codes : V00 (Vegetation Management)
 V04 (Exotic Plant Management)

10-238 Package Number :

Problem Statement

The semi-arid lands of south central Idaho have been particularly susceptible to the invasion and establishment of non-native plants within the reserve. These non-native species have found ideal habitat, particularly in areas where the soils have been disturbed. Intense grazing, dryland farming, and other events associated with the settlement of the area have provided an impetus to the invasion by non-native plants. In recent years an increase in vegetative disturbance within the reserve has been attributed to an increase in recreational activities. The overuse of the land in some areas of the reserve has caused the loss of vegetative cover and the soils to erode providing the ideal opportunity for advantageous non-native plants to invade.

There currently is no inventory of the non-native plants within the reserve. The extent and location of invasive plants is not known. Before any plan can be made to control or eradicate non-native plants an inventory must be conducted. In addition, the plants and their distribution must be mapped. Incorporating these distribution maps into a geographic information system for use by the park is an essential first step for managing non-native plants.

Description of Recommended Project or Activity

The University of Idaho in conjunction with the Columbia Cascades Support Office has initiated an inventory of non-native plants within the reserve. The results of the project will provide to the reserve a high resolution non-native plant distribution map. The map will be provided in hard copy and as digital GIS files in ARC-INFO format. A report will also be provided to the reserve describing the study, containing background information on each weed species class, and a prioritized ranking of each species in terms of their current level of impact and feasibility of control. This project should be completed and delivered to the reserve by September, 1997.

This project should provide the reserve with the basis to develop and implement a non-native plant control program. It should also provide the reserve with information to share with Cassia County, inholders, and reserve neighbors in a united front to control non-native plants.

Once this project is completed there will need to be follow-up monitoring to track the spread or reduction of spread because of control actions. It will be necessary to maintain up-to-date and accurate maps.

BUDGET AND FTEs:

-----FUNDED-----					
	Source	Activity	Fund Type	Budget (\$1000s)	FTEs
1997:	NRPP	RES	One-time	5.00	0.04
Total:				5.00	0.04
-----UNFUNDED-----					
		Activity	Fund Type	Budget (\$1000s)	FTEs
Year 1:		ADM	Recurring	1.00	0.02
		MON	Recurring	3.00	0.10
	Subtotal:			4.00	0.12
Year 2:		ADM	Recurring	1.00	0.02
		MON	Recurring	3.00	0.10
	Subtotal:			4.00	0.12
Year 3:		ADM	Recurring	1.00	0.02
		MON	Recurring	3.00	0.02
	Subtotal:			4.00	0.04
Year 4:		ADM	Recurring	1.00	0.02
		MON	Recurring	3.00	0.02
	Subtotal:			4.00	0.04
Total:				16.00	0.32

(Optional) Alternative Actions/Solutions and Impacts
(No information provided)

Compliance codes: EXCL (CATEGORICAL EXCLUSION)

Explanation: 516 DM2 APP. 2, 1.6

Last Update: 02/06/97
Initial Proposal: 1994

Project Statement

CIRO-N-621.000
Priority: 5

Title: **DEVELOP\IMPLEMENT NON-NATIVE PLANT CONTROL PROGRAM**

Funding Status: Funded: 8.00 Unfunded: 24.00

Servicewide Issues : N05 (NON-NAT PLANTS)
 N08 (CULT LANDSCAPE)
Cultural Resource Type: COMB (Combination)
N-RMAP Program codes : V00 (Vegetation Management)
 V04 (Exotic Plant Management)

10-238 Package Number :

Problem Statement

Of the 9,641 acres of the reserve, 6,220 acres have been impacted by the invasion of non-native plants causing at least some degradation to the native plant communities and the cultural landscape. Approximately 63 species of non-native plants occur within the reserve. Of these, tow species pose a serious threat at present: Musk Thistle and Black Henbane. In addition, Halogetin must be controlled because it is toxic to livestock. The areas of invasion are predominately located where soils have been disturbed along roadsides, trails, recreation areas and grazing allotments. Surrounding communities, individual land owners, and state and county weed control agents have indicated that the reserve is a source for weed propagules and vice versa. Federal law and policy mandates the control and eradication (where feasible) of noxious weeds on reserve lands. State law requires the mitigation of designated noxious weed species on private and public lands.

While some mitigative efforts have been made, the reserve lacks a comprehensive program to control non-native plants. Non-native plant management is not a light undertaking, both staff and funding are required to implement such a program. The reserve currently does not have sufficient staff or funding to meet the needs of a non-native plant control program.

The reserve does work cooperatively with Cassia County in mitigating some of the impacts along roadsides. However, a more concerted effort must be mounted to include inholders, grazing allotment permittees, surrounding landowners, and the reserve. By working cooperatively and prioritizing weed management efforts some strides could be made toward non-native plant control. Currently there is no cooperative agreement in place among the parties mentioned above.

Also lacking is an inventory and distribution mapping of non-native plant species. The completion of this inventory and mapping is a

necessity before any control program can be implemented. Fortunately, such a project is underway and is expected to be completed by September, 1997. The results of this project should be the basis for establishing a control program and identifying its needs.

Description of Recommended Project or Activity

From the inventory and distribution mapping of non-native plants to be completed in September, 1997, an assessment should be made as to the staffing and funding required to mount a non-native plant control program to address the high priority weed species. The reserve then needs to share this information with the state and county weed control agents as well as surrounding landowners, inholders, and grazing allotment permittees. A cooperative agreement then needs to be established identifying cooperative ventures and responsibilities.

Based on the list of prioritized weed species to control, the cooperative should agree on the methods of control and areas to be treated. Control methods may include physical, cultural, biological or chemical control treatments. Control efforts will be monitored to ensure successful management of non-native plant species.

In addition to the control program, revegetation needs to be considered and implemented. For every ground-disturbing activity or landscape management project weed control and revegetation should be an integral part of the project.

Until the program is developed and implemented, the reserve will continue its cooperative management of weed species along roadsides with Cassia County, and the physical control methods conducted by reserve staff in various areas of the reserve.

BUDGET AND FTEs:

-----FUNDED-----				
Source	Activity	Fund Type	Budget (\$1000s)	FTEs
1997:	PKBASE-NR MIT	Recurring	2.00	0.06
1998:	PKBASE-NR MIT	Recurring	2.00	0.06
1999:	PKBASE-NR MIT	Recurring	2.00	0.06
2000:	PKBASE-NR MIT	Recurring	2.00	0.06
Total:			8.00	0.24

-----UNFUNDED-----				
	Activity	Fund Type	Budget (\$1000s)	FTEs
Year 1:	ADM	Recurring	1.00	0.02
	MIT	Recurring	5.00	0.12
	Subtotal:		6.00	0.14
Year 2:	ADM	Recurring	1.00	0.02
	MIT	Recurring	5.00	0.12
	Subtotal:		6.00	0.14
Year 3:	ADM	Recurring	1.00	0.02
	MIT	Recurring	5.00	0.12
	Subtotal:		6.00	0.14
Year 4:	ADM	Recurring	1.00	0.02
	MIT	Recurring	5.00	0.12
	Subtotal:		6.00	0.14
Total:			24.00	0.56

(Optional) Alternative Actions/Solutions and Impacts
(No information provided)

Compliance codes: EA (ENV. ASSESSMENT)
NHPA ((106) NAT. HIST. PRES.)

Explanation: 516 DM6 APP.7.4E

Last Update: 02/05/97
Initial Proposal: 1994

Project Statement

CIRO-N-640.000
Priority: 999

Title: **CONDUCT BIOLOGICAL ASSESSMENT OF FOREST COMMUNITIES**

Funding Status: Funded: 0.00 Unfunded: 0.00

Service-wide Issues : N24 (OTHER (NATURAL))
 N17 (BIODIVERSITY)

Cultural Resource Type: CULL (Cultural Landscape)
N-RMAP Program codes :

10-238 Package Number :

Problem Statement

Many of the vegetative communities of the Reserve have been impacted by human activities. Aspen plant communities are a major physiological feature upon the landscape. These are an important component both ecologically and for enhancement of the visitor's experience when recreating on the reserve. Presently, there is little information regarding the overall trend in the health of the aspen thickets and groves on the Reserve or the role they play in providing habitat for wildlife. The aspen on the Reserve are impacted by a variety of factors. Many of these impacts are as a result of cattle grazing, the exclusion of fire, visitor use, and disease. In many of the aspen stands there is an obvious lack of regeneration.

Likewise, Douglas Fir-Spruce-Lodgepole forest stands show declining health. Forest pests, drought or lack of fire may all be contributing to the problem.

Description of Recommended Project or Activity

To totally understand the dynamics of aspen ecology, as well as Douglas Fir-spruce-lodgepole stands in the Reserve it is crucial to establish a monitoring program to provide basic information as to floristic composition, structure, and successional dynamics. This information will be incorporated into the Vegetation Management Plan to further make management recommendations to mitigate any degradation of the aspen plant communities. Multivariate analysis will be used to interpret the ordination and assess the changes in the aspen community structure. Community association will be measured to fully understand stand dynamics. The study will be GIS compatible.

The first step is to locate a forest or plant pathologist/ ecologist to conduct a preliminary assessment.

BUDGET AND FTEs:

-----FUNDED-----				
Source	Activity	Fund Type	Budget (\$1000s)	FTEs
			=====	=====
Total:			0.00	0.00
-----UNFUNDED-----				
	Activity	Fund Type	Budget (\$1000s)	FTEs
			=====	=====
Total:			0.00	0.00

(Optional) Alternative Actions/Solutions and Impacts
(No information provided)

Compliance codes: EXCL (CATEGORICAL EXCLUSION)

Explanation: 516 DM2 APP. 2, 1.6

Project Statement
Last Update: 02/06/97
Initial Proposal: 1994

CIRO-N-650.000
Priority: 7

Title: **DETERMINE LEVEL OF BIODIVERSITY**

Funding Status: Funded: 0.00 Unfunded: 0.00

Servicewide Issues : N17 (BIODIVERSITY)
Cultural Resource Type:
N-RMAP Program codes :

10-238 Package Number :

Problem Statement

Presently, there is very little data identifying the extent of specie richness and abundance as it relates to the biodiversity of invertebrates, vertebrates, and distribution of these species throughout the Reserve. There are informal checklists for birds and wildlife that are used for interpretation. Little, if any, documentation exists in the Reserve records of invertebrate populations.

Description of Recommended Project or Activity

A wildlife inventory(s) of both game and non-game species which provides baseline information and some means of evaluating changes over time is needed. A Cooperative Park Studies Unit would probably be the logical entity to assist with such an undertaking. A resource management specialist on the Reserves's staff is needed to coordinate the efforts and probably accomplish much of the routine inventory. Field work assistance from the seasonal ranger staff would also require a modest increase in funding.

BUDGET AND FTEs:

-----FUNDED-----				
Source	Activity	Fund Type	Budget (\$1000s)	FTEs
			=====	=====
Total:			0.00	0.00
-----UNFUNDED-----				
	Activity	Fund Type	Budget (\$1000s)	FTEs
			=====	=====
Total:			0.00	0.00

(Optional) Alternative Actions/Solutions and Impacts
(No information provided)

Compliance codes: EXCL (CATEGORICAL EXCLUSION)

Explanation: 516 DM2 APP. 2, 1.6

Project Statement
Last Update: 11/19/96
Initial Proposal: 1994

CIRO-N-660.007
Priority: 999

Title: **DEVELOP A WILDLIFE MANAGEMENT PLAN**
Sub-title: **SURVEY and MONITOR RAPTOR DISTRIBUTION and POPULATIONS**

Funding Status: Funded: 0.00 Unfunded: 10.00

Servicewide Issues : N17 (BIODIVERSITY)
 N18 (VIS USE-BCTRY)
Cultural Resource Type: CULL (Cultural Landscape)
N-RMAP Program codes :

10-238 Package Number :

Problem Statement

The geology of City of Rocks is uniquely suited to more intense populations of nesting raptors. Eight species of raptors are either suspected or confirmed to be nesting within the reserve. In recent decades, climbing has become a major recreational activity which has brought nesting raptors and climbers into conflict. Climbers (or any human disturbance) frighten birds from nesting activity. If this disturbance continues several times during the same season, the parent may abandon the nest, or choose alternative nesting sites outside the reserve. In the past, when nests were known to be occupied, adjacent climbing routes were closed. Unfortunately, this method does not insure that all nesting raptors are protected.

Description of Recommended Project or Activity

A survey concentrated in the high-use areas of section 25,36 T15S, R23E and section 31, T15S, R24E, is proposed for the first year of this study. It will be conducted during the months of April, May and June to determine location of nesting raptors. The survey will require no less than 80 hours each month in the field, and will require climbing rock features, making observations from high vantage points (Lookout Rock, Buzzard Perch, Strip Rock) inspecting known nest sites, and examining all suspected sites.

During the second year, a survey concentrated in remote locations (Research Natural Area, Smokey Mountain, Cedar Hills etc..) will be conducted during the same months (April, May, June). No less than 100 hours each month will be required in the field to insure a thorough survey of these areas.

In both surveys, current methodologies will be used and proper documentation made including GIS incorporation. Surveys will include assessment as to the probability of disturbance to nest site from

climbing or other human activities, and will make recommendations to management for appropriate action.

Each year thereafter, nest sites susceptible to disturbance must be confirmed as active, and climbing routes closed as necessary.

BUDGET AND FTEs:

-----FUNDED-----					
Source	Activity	Fund Type	Budget (\$1000s)	FTEs	
Total:			0.00	0.00	
-----UNFUNDED-----					
	Activity	Fund Type	Budget (\$1000s)	FTEs	
Year 1:	MON	Recurring	4.00	0.20	
Year 2:	MON	Recurring	5.00	0.30	
Year 3:	MON	Recurring	0.50	0.02	
Year 4:	MON	Recurring	0.50	0.02	
Total:			10.00	0.54	

(Optional) Alternative Actions/Solutions and Impacts
(No information provided)

Compliance codes: EXCL (CATEGORICAL EXCLUSION)

Explanation: 516 DM2 APP. 2, 1.6

Project Statement
Last Update: 11/19/96
Initial Proposal: 1994

CIRO-N-700.000
Priority: 999

Title: **DEVELOP A WILDLAND FIRE MANAGEMENT PLAN**

Funding Status: Funded: 0.00 Unfunded: 0.00

Servicewide Issues : N07 (NAT FIRE REGM)
Cultural Resource Type: CULL (Cultural Landscape)
N-RMAP Program codes : C00 (Collections and Data Management)
 C01 (Natural Resource Collections
 Management)

10-238 Package Number :

Problem Statement

Fire suppression services are currently provided by CIRO's 8-man fire team with support, by MOU, from the BLM and USFS. There are no provisions for the use of prescribed natural fire or managed ignited fires to restore native plant communities and ecosystem processes. A fire management plan is needed for compliance with NPS guidelines, including NPS-8 Fire Management Guidelines, and NPS-77 Natural Resource Management Guidelines. A fire plan will give direction in the management of maintaining and protecting cultural landscapes as mandated by the CMP.

Description of Recommended Project or Activity

CCSO Fire Management Staff, in conjunction with CIRO Superintendent and lead Natural Resource Ranger, will prepare a fire management plan consistent with NPS guidelines and commensurate with the resource values to be protected.

Related Projects:

CIRO-N-700.001 Research and map fire history
CIRO-N-700.002 Inventory and map fuel loads
CIRO-N-700.003 Research fire effects as it relates to vegetative
 response as well as biochemical cycles
CIRO-N-700.004 Manage to restore ecosystem and achieve cultural
 landscape objectives for mosaics of seral
 vegetation and biodiversity

BUDGET AND FTEs:

-----FUNDED-----				
Source	Activity	Fund Type	Budget (\$1000s)	FTEs
			=====	=====
Total:			0.00	0.00
-----UNFUNDED-----				
	Activity	Fund Type	Budget (\$1000s)	FTEs
			=====	=====
Total:			0.00	0.00

(Optional) Alternative Actions/Solutions and Impacts
(No information provided)

Compliance codes: EXCL (CATEGORICAL EXCLUSION)

Explanation: 516 DM6 APP. 7.4 B

Project Statement
Last Update: 02/06/97
Initial Proposal: 1994

CIRO-N-700.001
Priority: 2

Title: **DEVELOP A WILDLAND FIRE MANAGEMENT PLAN**
Sub-title: **RESEARCH/MAP FIRE HISTORY**

Funding Status: Funded: 0.00 Unfunded: 88.00

Servicewide Issues : N07 (NAT FIRE REGM)
Cultural Resource Type: CULL (Cultural Landscape)
N-RMAP Program codes : C00 (Collections and Data Management)
 C01 (Natural Resource Collections
 Management)

10-238 Package Number :

Problem Statement

Management decisions regarding implementation of fire upon the landscape, establish grazing utilization levels, and maintaining biological diversity, depends on accurate knowledge of the fire history that has occurred within the reserve.

Through field observations there is a preponderance of evidence that fire was a major ecological factor historically on the reserve. This can be seen throughout the landscape by evidence in the form of charcoal in the soil, charred wood on the soil surface, and scarred trees in the climax juniper stands. Also there are many recent vegetative mosaics created by wildland fires where limited suppression action was taken by local firefighting resources.

Much of the reserve is dominated by a woody/shrubby vegetative component. This consists of a dense cover of sagebrush, juniper, and pinyon pine with a mixture of annual and perennial grasses and forbs. Much of the perennial grass community has been replaced by exotic annuals along with unnatural density levels both trees and shrubs. The result is an increase in fuel loads, particularly the light fuels where overgrazing has occurred, which are flashy and easily carry a fire. Junipers and pinyon pine, as well as sagebrush and other shrubs, have expanded their range throughout the reserve since the westward migration during the mid-1800's by settlers. The spread of woody/shrubby dominant species is suspected to be largely due to the control of fires and the effects of the destruction of grassland vegetation early on, by heavy livestock grazing. Junipers as well as shrubs, are depriving the native grasses of water and nutrients, and further suppressing the establishment of native plants. The result is an unnatural and deteriorated plant ecosystem with increasing hazardous fuel accumulations.

Description of Recommended Project or Activity

Conduct a comprehensive fire history study for the area. Check all historical Forest Service records, oral history, and pioneer accounts. Undertake an exhaustive field survey of old burns. Start with an aerial survey and follow up on the ground with pyrodendrochronology work on existing basal fire scars on trees. Fuel model and slope classification will be completed to determine fire behavior potential for the area. All information will be GIS compatible and become a part of the thematic data base for the reserve. When completed the Park's fire management plan will be revised to reflect the study's findings. Subsequently it is anticipated that the reserve will undertake an expanded wildland fire management program to include prescribed burning. Additional funding to support this effort, including assistance from cooperating agencies such as the Bureau of Land Management, US Forest Service, and the Idaho Department of Parks and Recreation, will be needed. The expanded program will include modification of the fire management plan; preparation of prescribed burn plans; coordination with adjoining land owners and implementation of the burns.

BUDGET AND FTEs:

-----FUNDED-----					
Source	Activity	Fund Type	Budget (\$1000s)	FTEs	
Total:			0.00	0.00	
-----UNFUNDED-----					
	Activity	Fund Type	Budget (\$1000s)	FTEs	
Year 1:	MIT	Recurring	12.00	0.30	
	ADM	Recurring	10.00	0.10	
	Subtotal:		22.00	0.40	
Year 2:	MIT	Recurring	12.00	0.30	
	ADM	Recurring	10.00	0.10	
	Subtotal:		22.00	0.40	
Year 3:	MIT	Recurring	12.00	0.30	
	ADM	Recurring	10.00	0.10	
	Subtotal:		22.00	0.40	
Year 4:	MIT	Recurring	12.00	0.30	
	ADM	Recurring	10.00	0.10	
	Subtotal:		22.00	0.40	
Total:			88.00	1.60	

(Optional) Alternative Actions/Solutions and Impacts
(No information provided)

Compliance codes: EXCL (CATEGORICAL EXCLUSION)

Explanation: 516 DM2 APP. 2, 1.6

Project Statement
Last Update: 09/02/96
Initial Proposal: 1994

CIRO-N-740.000
Priority: 999

Title: **DEVELOP AND IMPLEMENT AN IPM PLAN**

Funding Status: Funded: 14.00 Unfunded: 59.00

Servicewide Issues : N05 (NON-NAT PLANTS)
 C18 (IPM)
Cultural Resource Type: CULL (Cultural Landscape)
N-RMAP Program codes : H00 (Pest and Hazard Management)
 H01 (Integrated Pest Management)

10-238 Package Number :

Problem Statement

Since 1983, the National Park Service has adopted an integrated approach for the management of pest species. Animal and plant populations which interfere with the purposes of the Reserve or damage Reserve structures are considered pests and require control. The Integrated Pest Management (IPM) approach uses physical, cultural, and biological means to address pest issues before resorting to the use of chemicals. There are several exotic plant populations and noxious weeds which have adversely affected the native plants of the Reserve. In addition, it is unknown whether or not plant pathogens or forest insects are affecting the spruce-fir forests and aspen regeneration.

The activities of a few pests affect the health and safety of visitors and employees. Yellowjackets, for example, nest in and around recreation areas. Control methods are needed to reduce visitor/employee/yellowjacket encounters. Occasionally, mice will invade park structures.

An IPM program requires that an inventory of pests be conducted to determine the location and abundance of the pest; a threshold needs to be established beyond which the Reserve will take control actions; monitoring of pest populations needs to be conducted on a routine basis; and treatment applications need to be the leasttoxic to resolve the problem. The Reserve's IPM Coordinator should be trained in IPM techniques: pest monitoring and inventory, treatment and evaluation, safety, and record keeping. In addition, if the Reserve uses approved chemicals against pest infestations then the applicator must be certified by the state and there must be appropriate storage facilities and safety procedures in place for the storage and handling of chemicals. The Reserve currently has a cooperative agreement with the county for the management of some weed species.

Many of the activities identified above are lacking at the Reserve. Pest inventories need to be conducted and then an IPM Plan developed.

In addition, the Reserve's IPM Coordinator needs to attend the NPS IPM training and other Reserve staff also need IPM training.

Description of Recommended Project or Activity

A pest inventory, including plants, vertebrates, and insects, and a monitoring program should be established and incorporated in an Integrated Pest Management Plan. This is the basis from which all IPM actions should be taken. A monitoring program should be implemented that will indicate distribution and population trends in relation to established threshold limits for each pest. When a particular pest population reaches or exceeds threshold limits, the most appropriate (safest and lowest impact to Reserve resources) control method, utilizing established NPS guidelines and following environmental and cultural compliance regulations and procedures, should be implemented.

In order to implement an IPM program the Reserve will first conduct an inventory to identify its major pests. From this inventory, management action plans will be developed which will identify the pest's biology, monitoring techniques, threshold limit, and control strategies. Information and literature should also be collected. In addition, an IPM Plan will describe the operational aspects of the program, defining individual responsibilities as well as interdivisional relationships within the Reserve, and external cooperative agreements.

Training is also a necessary component of an IPM program. The Reserve's IPM Coordinator should attend the NPS IPM course. In addition, any applicator of pesticides within the Reserve should be certified by the state of Idaho. Training should also be conducted for others of the Reserve staff who would have a role in the IPM program, e.g., Cultural and Natural Resources, Interpretation, Maintenance, and Administration.

BUDGET AND FTEs:

		-----FUNDED-----		
	Source	Activity	Fund Type	Budget (\$1000s) FTEs
1997:	PKBASE-NR	MIT	Recurring	3.00 0.06
	NON-NPS-O	MIT	Recurring	2.00 0.04
			Subtotal:	5.00 0.10
1998:	PKBASE-NR	MIT	Recurring	3.00 0.06
1999:	PKBASE-NR	MIT	Recurring	3.00 0.06
2000:	PKBASE-NR	MIT	Recurring	3.00 0.06
			Total:	14.00 0.28

		-----UNFUNDED-----		
		Activity	Fund Type	Budget (\$1000s) FTEs
Year 1:		ADM	Recurring	1.00 0.02
		RES	One-time	25.00 0.50
			Subtotal:	26.00 0.52
Year 2:		MIT	Recurring	10.00 0.25
		ADM	Recurring	1.00 0.02
			Subtotal:	11.00 0.27
Year 3:		MIT	Recurring	10.00 0.25
		ADM	Recurring	1.00 0.02
			Subtotal:	11.00 0.27
Year 4:		MIT	Recurring	10.00 0.25
		ADM	Recurring	1.00 0.02
			Subtotal:	11.00 0.27
			Total:	59.00 1.33

(Optional) Alternative Actions/Solutions and Impacts
(No information provided)

Compliance codes: EXCL (CATEGORICAL EXCLUSION)
NHPA ((106) NAT. HIST. PRES.)

Explanation: 516 DM6 APP. 7.4 E

Project Statement
Last Update: 01/30/97
Initial Proposal: 1994

CIRO-N-830.000
Priority: 3

Title: **MONITOR AND EVALUATE HUNTING WITHIN THE RESERVE**

Funding Status: Funded: 0.00 Unfunded: 7.00

Servicewide Issues : N18 (VIS USE-BCTRY)
N19 (CONSUMPT USE)

Cultural Resource Type:
N-RMAP Program codes :

10-238 Package Number :

Problem Statement

Public Law 101-512--November 5, 1990 specifically permits hunting as a viable form of recreation within the reserve. City of Rocks falls within Unit 55 of the Idaho Department of Fish and Game management system. The hunting of mule deer, mountain lion, wild turkey and other upland game birds as well as small game are permitted in season.

Hunters are the primary user of the reserve in the late fall and winter. The number of hunters, number and species of game taken, and the facilities, roads and trails used should be evaluated to assist reserve managers with decisions that may effect this permitted use.

Description of Recommended Project or Activity

A survey will be conducted to determine demographics of hunters using the reserve, the species hunted/killed and numbers, areas of the reserve that are hunted, the types of facilities used and requested, and length of stay for hunting parties.

Based on this information, managers can invoke ideal strategies that continue to protect the resources while providing opportunities for recreation.

Related projects:

CIRO-N-660.000 Develop a wildlife management plan
CIRO-N-660.005 Manage hunting program in cooperation with the
state

BUDGET AND FTEs:

-----FUNDED-----				
Source	Activity	Fund Type	Budget (\$1000s)	FTEs
Total:			0.00	0.00
-----UNFUNDED-----				
	Activity	Fund Type	Budget (\$1000s)	FTEs
Year 1:	RES	One-time	7.00	0.40
Total:			7.00	0.40

(Optional) Alternative Actions/Solutions and Impacts
(No information provided)

Compliance codes: EXCL (CATEGORICAL EXCLUSION)

Explanation: 516 DM6 APP. 7.4 D

Project Statement
Last Update: 09/02/96
Initial Proposal: 1994

CIRO-N-850.000
Priority: 999

Title: DEVELOP A LAND PROTECTION PLAN

Funding Status: Funded: 0.00 Unfunded: 10.00

Servicewide Issues : N06 (LAND USE PRAC)
 N24 (OTHER (NATURAL))

Cultural Resource Type:
N-RMAP Program codes :

10-238 Package Number :

Problem Statement

Currently City of Rocks National Reserve (CIRO) does not have a Land Protection Plan (LPP) which is the primary document outlining objectives and targets for land acquisition critical to preservation and management of the reserve's resources. The LLP identifies the alternative methods that provide for the protection of resources, for visitor use, and for development; identify the minimum interest necessary for those purposes; and establishes priorities for acquisition of land or interests in land. As defined in the enabling legislation, the NPS and the state of Idaho, along with other Federal agencies and private citizens, have holdings within the reserve boundary. Of special concern are the properties currently in private ownership with significant resources that remain unprotected, leaving their cultural, natural, and scenic values for which the reserve was established in danger of being lost. In addition to fee simple title, alternative management and land acquisition strategies such as easements, historic property leasing, development rights, and other techniques, need to be explored and documented, so that management has options for protecting critical areas and significant resources both within and adjacent to the reserve. Exploring a range of strategies for land protection allows specific resource needs to be addressed by a variety of viable preservation techniques. These findings can be incorporated in a LLP, allowing some flexibility in long-term goals and objectives for acquisition.

Besides identifying critical lands for acquisition or protection through other means the reserve's current designated lands also need to be protected. The boundaries need to be surveyed and posted.

Zoning ordinances are a potential method for land protection. The current zoning for CIRO is that of Historic Preservation. zoning ordinances of surrounding lands within the viewshed of the reserve are classified as Multiple Use. Cassia County has identified several purposes for which zoning ordinances have been established. Among these purposes are:

7. To foster agriculture and industry, together with the uses related thereto.
11. To protect historically, significant landmarks, areas and resources.

The Board of County Commissioners approves zoning ordinances within the county subsequent to public hearings.

Description of Recommended Project or Activity

Complete the development of a Land Protection Plan which documents the strategies that will protect the cultural and natural resources for which CIRO was created. Land Protection recommendations will be based on adequate justifications considering resources and public use. justifications will consider the resource values of the nonfederal lands and the potential for impacts on other lands already in federal ownership. Fee purchase will usually be considered necessary and appropriate when other means of protection are determined to be inadequate. These land protection strategies would include the following:

1. Identify and evaluate critical nonfederal lands which would protect the cultural, natural, and scenic resources and contribute to the purposes for which CIRO was established.
2. Identify the various land protection techniques (ways to "buy" interest in land), and the pros and cons of each method, to be used in the acquisition in fee or interests the lands identified in 1.
3. Identify the benefits of land donation, land exchange, transfer, or other transactions of this nature to land owners identified in 1. transactions will be made only with willing land owners.
4. Seek appropriate zoning designations which would contribute to the protection of CIRO's cultural, natural, and scenic resources.
5. Identify funding sources, appropriate financial mechanisms for land acquisition, how to solicit the money, and where and when it can be used for land protection.

RELATED PROJECTS:

CIRO-I-402.000	Restore and Protect scenic qualities of vistas
CIRO-N-851.000	Conduct cadastral boundary survey
CIRO-N-852.000	Identify private lands for acquisition
CIRO-N-401.000	Identify internal and external historic and scenic viewsheds

BUDGET AND FTEs:

-----FUNDED-----				
Source	Activity	Fund Type	Budget (\$1000s)	FTEs
Total:			0.00	0.00
-----UNFUNDED-----				
	Activity	Fund Type	Budget (\$1000s)	FTEs
Year 1:	RES	One-time	10.00	0.20
Year 2:	MON	Recurring	0.00	0.20
Year 3:	MON	Recurring	0.00	0.20
Year 4:	MON	Recurring	0.00	0.20
Total:			10.00	0.80

(Optional) Alternative Actions/Solutions and Impacts
(No information provided)

Compliance codes: EXCL (CATEGORICAL EXCLUSION)

Explanation: 516 DM6 APP. 7.4 B

Priority:

Servicewide Issues: N14, N16, N20

A. Statement of Issue or Problem:

The aquatic biota in the streams, ponds, and springs at City of Rocks National Reserve is relatively unknown. The historic use and manipulations by humans has altered the habitat and probably caused a decline in biodiversity. If current management can effectively institute the federal land management riparian standards for livestock grazing, the aquatic flora and fauna will definitely benefit. The riparian habitat is the most biologically productive and sensitive in the Great Basin physiographic region. The kinds of plants and wildlife inhabiting this biologically rich area include: various zooplanktons and phytoplanktons, numerous insects and other arthropods, amphibians, and fish.

The NPS and Idaho Department of Parks and Recreation are required to maintain as near pristine water quality as possible within the Reserve under provisions of the NPS Organic Act of 1916, enabling legislation for the Reserve (P.L. 100-696, Title II), NPS Management Policies (1989), the Federal Safe Drinking Water Act of 1974, and Idaho Department of Ecology water quality criteria for non-potable waters.

B. Current Management Actions:

The NPS and Idaho Department of Parks and Recreation currently do not know the aquatic flora and fauna.

C. Description of Recommended Action:

After determining the physical and chemical component of aquatic environments, an inventory of their flora and fauna will establish an important baseline and foundation for future long-term monitoring. The EPA Rapid Bioassessment Protocols for monitoring are the most cost effective method.

This inventory will give managers an immediate indication of the overall condition of the natural resource. Sampling will include crustacean zooplankton and rotifers, phytoplankton, benthic macroinvertebrates, amphibians, and fish. If bird and bat species were included it would provide a valuable link to terrestrial biodiversity and an assessment of overall ecological "health" as well. (Using mist nets at night over riparian areas is an excellent method of determining the number of bat species and their relative populations.)

As land management practices change over time, aquatic flora and fauna will provide the best indicators for evaluating that change whether the management action was on terrestrial or aquatic resources. The aquatic system integrates the cumulative effects

relatively fast at detectable levels for future monitoring; reference CIRO-N-400.07, Develop a Long-Term Water Monitoring Strategy.

Budget:

CIRO-N-400.03 Inventory Aquatic Flora and Fauna	YEAR IN PROGRAM SEQUENCE			
	1st	2nd	3rd	4th
Personal Services	\$15K 00	\$10K	\$00K	
Other	\$05K	\$5K	\$0K	
TOTAL	\$20K 00	\$15K	\$00K	
Funds Available in Park Base	00	0	0	
Additional Funds Needed	\$20K 00	\$15K	\$00K	

D. Compliance:

NEPA Categorical Exclusion: 516 DM 6, Appendix 7: 7.4 B. Plans, Studies and Reports, 4. Plans, including priorities, justifications and strategies, for non-manipulative research, monitoring, inventorying and information gathering.

PROJECT STATEMENT SHEET

PROJECT NUMBER: CIRO-N-

TITLE: ECOLOGICAL EVALUATION OF ASPEN COMMUNITIES

Statement of Issue or Problem:

Many of the vegetative communities of the Reserve have been impacted by human activities. Aspen plant communities are a major physiological feature upon the landscape. These are an important component both ecologically and for enhancement of the visitor's experience when recreating on the reserve. Presently, there is little information regarding the overall trend in the health of the aspen thickets and groves on the Reserve or the role they play in providing habitat for wildlife. The aspen on the Reserve are impacted by a variety of factors. Many of these impacts are as a result of cattle grazing, the exclusion of fire, visitor use, and disease. In many of the aspen stands there is an obvious lack of regeneration

DESCRIPTION OF RECOMMENDED PROJECT OR ACTIVITY:

To totally understand the dynamics of the ecology with the aspen stands on the Reserve it is crucial to establish a monitoring program to provide basic information as to floristic composition, structure, and successional dynamics. This information will be incorporated into the Vegetation Management Plan to further make management recommendations to mitigate any degradation of the aspen plant communities. Multivariate analysis will be used to interpret the ordination and assess the changes in the aspen community structure. Community association will be measured to fully understand stand dynamics. The study will be GIS compatible.

COMPLIANCE NEEDS:

Environmental Assessment

FUNDING AND STAFFING NEEDS:

=====FUNDED=====				
	Source	Act Type	Budget (\$1000)	FTEs
Year 1:	RG-NS-RES	RES	0.00	0.0
	PKBASE-NR	ADM	0.00	0.0

	Subtotal:		0.00	0.0

Year 2:	RG-NS-RES RES	0.00	0.0
	PKBASE-NR ADM	0.00	0.0
	Subtotal:	0.00	0.0
Year 3:	RG-NS-RES RES	0.00	0.0
	PKBASE-NR ADM	0.00	0.0
	Subtotal:	0.00	0.0
Year 4:	RG-NS-RES RES	0.00	0.0
	PKBASE-NR ADM	0.00	0.0
	Subtotal:	0.00	0.0
	TOTAL:	0.00	0.0

=====UNFUNDED=====

	Source	Act	Type	Budget (\$1000)	FTEs
Year 1:	FIRE-\$		MIT	0.00	0.0
	PKBASE-NR		ADM	0.00	0.0
	Subtotal:			0.00	0.0
Year 2:	FIRE-\$		MIT	0.00	0.0
	PKBASE-NR		ADM	0.00	0.0
	Subtotal:			0.00	0.0
Year 3:	FIRE-\$		MIT	0.00	0.0
	PKBASE-NR		ADM	0.00	0.0
	Subtotal:			0.00	0.0
Year 4:	FIRE-\$		MIT	0.00	0.0
	PKBASE-NR		ADM	0.00	0.0
	Subtotal:			0.00	0.0
	TOTAL:				

PROJECT STATEMENT SHEET

PROJECT NUMBER: CIRO-N- 650.080

TITLE: DETERMINE THE LEVEL OF BIODIVERSITY

Statement of Issue:

Presently, there is very little data identifying the extent of specie richness and abundance as it relates to the biodiversity of invertebrates, vertebrates, and distribution of these species throughout the Reserve. There are informal checklists for birds and wildlife that are used for interpretation. Little, if any, documentation exists in the Reserve records of invertebrate populations.

PROJECT NUMBER: CIRO-N-

TITLE: DETERMINE THE LEVEL OF BIODIVERSITY

Statement of Issue or Problem:

The Reserve lacks a comprehensive inventory of wildlife populations and an appropriate program for monitoring these populations. Park staff informally maintain wildlife checklists, but these do not provide adequate baseline data or a systematic method for evaluating the condition of populations.

DESCRIPTION OF RECOMMENED PROJECT OR ACTIVITY:

A wildlife inventory(s) of both game and non-game species which provides baseline information and some means of evaluating changes over time is needed. A Cooperative Park Studies Unit would probably be the logical entity to assist with such an undertaking. A resource management specialist on the Reserves's staff is needed to coordinate the efforts and probably accomplish much of the routine inventory. Field work assistance from the seasonal ranger staff would also require a modest increase in funding.

COMPLIANCE NEEDS:

FUNDING AND STAFFING NEEDS:

=====FUNDED=====

Source	Act	Type	Budget(\$1000)	FTEs
--------	-----	------	----------------	------

Year 1:	RG-NS-RES RES	0.00	0.0
	PKBASE-NR ADM	0.00	0.0
	Subtotal:	0.00	0.0
Year 2:	RG-NS-RES RES	0.00	0.0
	PKBASE-NR ADM	0.00	0.0
	Subtotal:	0.00	0.0
Year 3:	RG-NS-RES RES	0.00	0.0
	PKBASE-NR ADM	0.00	0.0
	Subtotal:	0.00	0.0
Year 4:	RG-NS-RES RES	0.00	0.0
	PKBASE-NR ADM	0.00	0.0
	Subtotal:	0.00	0.0
	TOTAL:	0.00	0.0

=====UNFUNDED=====

	Source	Act Type	Budget (\$1000)	FTEs
Year 1:	NR-I&M	MON	0.00	0.0
	PKBASE-NR	MON	0.00	0.0
	Subtotal:		0.00	0.0
Year 2:	NR-I&M	MON	10.00	0.0
	PKBASE-NR	ADM	3.00	0.1
	Subtotal:		13.00	0.1
Year 3:	NR-I&M	MON	5.00	0.1
	PKBASE-NR	MON	3.00	0.0
	Subtotal:		8.00	0.1
Year 4:	PKBASE-NR	MON	3.00	0.1
	Subtotal:		.00	0.0
	TOTAL:		24.00	0.3

PROJECT STATEMENT SHEET

PROJECT NUMBER: CIRO-N-

TITLE: ASSESSMENT OF NATURAL FIRE REGIMES

Statement of Issue or Problem:

Management decisions regarding implementation of fire upon the landscape, establishing grazing utilization levels, and maintaining biological diversity, depends on accurate knowledge of the fire history that has occurred in the Reserve.

Through field observations there is a preponderance of evidence that fire was a major ecological factor historically on the the reserve. This can be seen throughout the landscape by evidence in the form of charcoal in the soil, charred wood on the soil surface, and scarred trees in the climax juniper stands. Also there are many recent vegetative mosaics created by wildland fires where limited suppression action was taken by local firefighting resources.

Much of the Reserve is dominated by a woody/shrubby vegetative component. This consists of a dense cover of sagebrush, juniper, and pinyon pine with a mixture of annual and perennial grasses and forbs. Much of the perennial grass community has been replaced by exotic annuals along with unnatural density levels both trees and shrubs. The result is an increase in fuel loads, particularly the light fuels where overgrazing has occurred, which are flashy and easily carry a fire. Junipers and pinyon pine, as well as sagebrush and other shrubs, have expanded their range throughout the reserve since the westward migration during the mid 1800's by settlers. The spread of woody/shrubby dominated species is suspected to be largely due to the control of fires and the effects of the destruction of grassland vegetation early on, by heavy livestock grazing. Junipers, as well as shrubs, are depriving the native grasses of water and nutrients, and further suppressing the establishment of native plants. The result is an unnatural and deteriorated plant ecosystem with increasing hazardous fuel accumulations.

DESCRIPTION OF RECOMMENED PROJECT OR ACTIVITY:

Conduct a comprehensive fire history study for the area. Check all historical Forest Service records, oral history, and pioneer accounts. Undertake an exhaustive field survey of all old burns. Start with an aerial survey and follow up on the ground with pyrodendrochronolgy work on existing basal fire scars on trees. Fuel model and slope class determinations will be completed to

dertermine fire behavior potential for the area. All information will be GIS compatible and become a part of the thematic data base for the reserve. When completed the park's Fire Management Plan will be revised to reflect the study's findings. Subsequently, it is anticipated that the reserve will undertake an expanded wildland fire management program to include prescribed burning. Additional funding to support this effort, including assistance from cooperating agencies such as the Bureau of Land Management, U.S. Forest Service, and the Idaho Department of Parks and Recreation, will be needed. The expanded program will include modification of the Fire Management Plan; preparation of prescribe burn plans; coordination with adjoining land owners and implementation of the burns.

COMPLIANCE NEEDS:

Environmental Assessment

FUNDING AND STAFFING NEEDS:

=====FUNDED=====					
	Source	Act	Type	Budget (\$1000)	FTEs
Year 1:	RG-NS-RES		RES		0.000.0
	PKBASE-NR		ADM		0.000.0

			Subtotal:		0.000.0
Year 2:	RG-NS-RES		RES		0.000.0
	PKBASE-NR		ADM		0.000.0

			Subtotal:		0.000.0
Year 3:	RG-NS-RES		RES		0.000.0
	PKBASE-NR		ADM		0.000.0

			Subtotal:		0.000.0
Year 4:	RG-NS-RES		RES		0.000.0
	PKBASE-NR		ADM		0.000.0

			Subtotal:		0.000.0
			=====		
			TOTAL:	0.00	0.0

=====UNFUNDED=====					
	Source	Act	Type	Budget (\$1000)	FTEs
Year 1:	FIRE-\$		MIT	12.00	0.3
	PKBASE-NR		ADM	10.00	0.1

			Subtotal:	22.00	0.4

Year 2:	FIRE-\$	MIT	12.00	0.3
	PKBASE-NR	ADM	10.00	0.1

	Subtotal:		22.00	0.4
Year 3:	FIRE-\$	MIT	12.00	0.3
	PKBASE-NR	ADM	10.00	0.1

	Subtotal:		22.00	0.4
Year 4:	FIRE-\$	MIT	12.00	0.3
	PKBASE-NR	ADM	10.00	0.1

	Subtotal:		22.00	0.4
	=====			
	TOTAL:		88.00	1.6

PROJECT STATEMENT SHEET

PROJECT NUMBER: CIRO-N-

TITLE: ASSESSMENT OF NATURAL FIRE REGIMES

Statement of Issue or Problem:

Management decisions regarding implementation of fire upon the landscape, establishing grazing utilization levels, and maintaining biological diversity, depends on accurate knowledge of the fire history that has occurred in the Reserve.

Through field observations there is a preponderance of evidence that fire was a major ecological factor historically on the the reserve. This can be seen throughout the landscape by evidence in the form of charcoal in the soil, charred wood on the soil surface, and scarred trees in the climax juniper stands. Also there are many recent vegetative mosaics created by wildland fires where limited suppression action was taken by local firefighting resources.

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DESCRIPTION OF RECOMMENED PROJECT OR ACTIVITY:

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base for the reserve. When completed the park's Fire Management Plan will be revised to reflect the study's findings. Subsequently, it is anticipated that the reserve will undertake an expanded wildland fire management program to include prescribed burning. Additional funding to support this effort, including assistance from cooperating agencies such as the Bureau of Land Management, U.S. Forest Service, and the Idaho Department of Parks and Recreation, will be needed. The expanded program will include modification of the Fire Management Plan; preparation of prescribe burn plans; coordination with adjoining land owners and implementation of the burns.

COMPLIANCE NEEDS:

Environmental Assessment

FUNDING AND STAFFING NEEDS:

=====FUNDED=====					
	Source	Act Type	Budget (\$1000)	FTEs	
Year 1:	RG-NS-RES	RES	0.00	0.0	
	PKBASE-NR	ADM	0.00	0.0	
	Subtotal:		0.00	0.0	
Year 2:	RG-NS-RES	RES	0.00	0.0	
	PKBASE-NR	ADM	0.00	0.0	
	Subtotal:		0.00	0.0	
Year 3:	RG-NS-RES	RES	0.00	0.0	
	PKBASE-NR	ADM	0.00	0.0	
	Subtotal:		0.00	0.0	
Year 4:	RG-NS-RES	RES	0.00	0.0	
	PKBASE-NR	ADM	0.00	0.0	
	Subtotal:		0.00	0.0	
	TOTAL:		0.00	0.0	

=====UNFUNDED=====					
	Source	Act Type	Budget (\$1000)	FTEs	
Year 1:	FIRE-\$	MIT	12.00	0.3	
	PKBASE-NR	ADM	10.00	0.1	
	Subtotal:		22.00	0.4	
Year 2:	FIRE-\$	MIT	12.00	0.3	
	PKBASE-NR	ADM	10.00	0.1	

	Subtotal:	22.00	0.4
Year 3:	FIRE-\$ MIT	12.00	0.3
	PKBASE-NR ADM	10.00	0.1
	Subtotal:	22.00	0.4
Year 4:	FIRE-\$ MIT	12.00	0.3
	PKBASE-NR ADM	10.00	0.1
	Subtotal:	22.00	0.4
	TOTAL:	88.00	1.6

APPENDICES

APPENDIX A

ENABLING LEGISLATION

PUBLIC LAW 100-696 -- NOV. 18, 1988

102 STAT. 4573

TITLE II -- CITY OF ROCKS NATIONAL RESERVE

ESTABLISHMENT OF CITY OF ROCKS NATIONAL RESERVE

SEC. 201. (a) There is hereby established the City of Rocks National Reserve (hereinafter referred to as the "reserve"), in order to preserve and protect the significant historical and cultural resources; to manage recreational use; to protect and maintain scenic quality; and to interpret the nationally significant values of the reserve.

Historic
preservation.
16 USC 460yy.

(b) The reserve shall include approximately fourteen thousand three hundred and twenty acres as depicted on the map entitled "Boundary map, City of Rocks National Reserve, Idaho" numbered P30-80,005 and dated October 1987. The map shall be on file in the offices of the National Park Service, Department of the Interior and the Offices of the Governor, State of Idaho.

(c) Within six months after the enactment of this title, the Secretary of the Interior (hereinafter in this title referred to as the "Secretary") shall file a legal description of the reserve designated under this section with the Committee on Interior and Insular Affairs of the United States House of Representatives and with the Committee on Energy and Natural Resources of the United States Senate. Such legal description shall have the same force and effect as if included in this title, except that the Secretary may correct clerical and typographical errors in such legal description and in the map referred to in subsection (b). The legal description shall be on file and available for public inspection in the offices of the National Park Service, Department of the Interior and the offices of the Governor of the State of Idaho.

Public
information.

PLAN AND MANAGEMENT OF RESERVE

SEC. 202. (a) To achieve the purpose of this title, the Secretary, acting through the National Park Service, in cooperation with appropriate State and Federal agencies, local units of government and local residents shall formulate a comprehensive plan for the protection, preservation, and interpretation of the reserve. The plan shall identify those areas or zones

State and local
governments.
16 USC 460yy-1.

within the reserve which would most appropriately be devoted to --

- (1) public use and development;
- (2) historic and natural preservation; and
- (3) private use subject to appropriate local ordinances designed to protect the historic rural setting.

(b) Within eighteen months following the date of enactment of this section, the Secretary shall transmit the plan to the President of the Senate and the Speaker of the House of Representatives and to the Governor of the State of Idaho.

(c) At such time as the State or appropriate units of local government having jurisdiction over land use within the reserve have enacted ordinances or established regulations which in the judgment of the Secretary will protect and preserve the historic and natural features of the area in accordance with the comprehensive plan, the Secretary shall, pursuant to cooperative agreement --

- (1) transfer management and administration over all or any part of the property acquired under subsection (d) of this section to the State or appropriate units of local government;
- (2) provide technical assistance to such State or units of local government in the management, protection, and interpretation of the reserve; and
- (3) make periodic grants, which shall be supplemental to any other funds to which the grantee may be entitled under any other provision of law, to such State or local unit of government to carry out the purposes of this title.

Grants.

(d)(1) The Secretary is authorized to acquire such lands and interests as he determines are necessary to accomplish the purposes of this title by donation, purchase with donated funds, or appropriated funds, or exchange, except that the Secretary may not acquire the fee simple title to any land without the consent of the owner. The Secretary shall, in addition, give prompt and careful consideration to any offer made by an individual owning property within the reserve to sell such property, if such individual notifies the Secretary that the continued ownership of such property is causing, or would result in, undue hardship.

(2) lands and waters, and interests therein, within the boundaries of the reserve which were administered by the Forest Service, United States, Department of Agriculture or the Bureau of Land Management, Department of the Interior prior to the date of enactment of this title are hereby transferred to the administrative jurisdiction of the Secretary to be administered by the National Park Service in accordance with this title.

(3) Lands and interest therein so acquired shall, so long as responsibility for management and administration remains with the United States, be administered by the Secretary subject to the provisions of the Act of August 25, 1916 (39 Stat. 535), as amended and supplemented, and in a

manner consistent with the purpose of this title.

(e) If, after the transfer of management and administration of any lands pursuant to subsection (c) of this section, the Secretary determines that the reserve is not being managed in a manner consistent with the purposes of this title, he shall so notify the appropriate officers of the State or local unit of government to which such transfer was made and provide for a one hundred and eighty-day period in which the transferee may make such modifications in applicable laws, ordinances, rules, and procedures as will be consistent with such purposes. If, upon the expiration of such one hundred and eighty-day period, the Secretary determines that such modifications have not been made or are inadequate, he shall withdraw the management and administration from the transferee and he shall manage such lands in accordance with the provisions of this title.

(f) Congress finds that there are unique circumstances with respect to the water and water-related resources within the Reserve designated by this title. The Congress recognized that the management of this area may be transferred to the State of Idaho, that the State has committed to providing the water necessary to fulfill the purposes of this title, and that there is little or no water or water-related resources that require the protection of a Federal reserved water right. Nothing in this title, nor any action taken pursuant thereto, shall constitute either an express or implied reservation of water or water right for any purpose: *Provided*, That the United States shall retain that reserved water right which is associated with the initial establishment and withdrawal of the national forest lands which will be transferred to the Reserve under this title.

Water.

(g) Subject to valid existing rights, Federal lands and interests therein, within the reserve, are hereby withdrawn from disposition under the public land laws and from entry or appropriation under the mining laws of the United States, from the operation of the mineral leasing laws of the United States, and from operation of the Geothermal Steam Act of 1970, as amended.

(h) There is hereby authorized to be appropriated not to exceed \$2,000,000 to carry out the provisions of this title.

Appropriation
authorization.

APPENDIX B

VASCULAR PLANTS OF CITY OF ROCKS AN ANNOTATED CHECKLIST

Tom John
January, 1995

The Study

The vascular flora of City of Rocks National Reserve was examined during three growing seasons from 1991 to 1993. A wide range of climatic conditions during this period may have allowed an unusually complete sampling of the flora. The Reserve lies astride a highland axis extending from the Rocky Mountains to the island-like mountain ranges of the Great Basin. Plants from both regions appear to advance and retreat along this axis in response to changing climatic conditions.

Voucher specimens were deposited at the Ray J. Davis Herbarium, Idaho State University, Pocatello, Idaho, and at the Intermountain Herbarium, Utah State University, Logan, Utah. It is expected that one set of vouchers from Idaho State University will one day reside at the Reserve, when suitable facilities are available. Identifications were made using the major floras covering the region, and verified in some instances through expert assistance, by comparison to herbarium specimens, and by reference to the recent scientific literature.

About the Checklist

The checklist is intended for use by practicing botanists or serious amateurs. The clubmosses, ferns, and conifers are treated first. Flowering plants follow, with dicots preceeding monocots. In all cases, families and genera are listed alphabetically, as are species beneath them. A limited and informal synonymy is provided so that persons using a single flora may recognize most if not all species. Plants that have been introduced to the region are preceeded by an asterisk. The description of plant distributions provided in the checklist is expressed in terms of general elevational limits or specific habitats. An outlying population of one of the two known Albion Range endemics (*Cymopterus davisii* Hartman) occurs in the Reserve at Graham Peak. With this exception, the plants are rather widely distributed and they reflect well the interplay of Rocky Mountain and Great Basin floristic influences. Although the unique soils and geology which can often be responsible for endemism are generally lacking at City of Rocks, cliff faces, shaded clefts, and other micro-habitats created by the rock formations do result in elevational displacements of certain species and abrupt transitions among habitats. These characteristics make the area a fascinating one for botanical observation.

References

The choice of botanical names was based on major floras and on the technical literature. Nomenclature was reasonably current as of early 1994, but innovations are frequent and extensive. The following list of references will allow persons using the checklist to find all of the plants (when aided by the limited synonymy).

1. *Intermountain Flora*-- this is intended to be the definitive flora for the geographic region in which City of Rocks is located. Unfortunately, this flora has been published over a quarter of a century and is still incomplete. Early volumes are becoming dated. These books may be obtained from the New York Botanical Garden.

Cronquist, A.H., A.H. Holmgren, N.H. Holmgren and J.L. Reveal. (1972) *Intermountain Flora, Vascular Plants of the Intermountain West, U.S.A.* Volume 1. Hafner Publishing. N.Y. and London. 270 pp.

Cronquist, A.H., A.H. Holmgren, N.H. Holmgren, J.L. Reveal, and P.K. Holmgren. (1977) *Intermountain Flora, Vascular Plants of the Intermountain West, U.S.A.* Volume 6, The Monocotyledons. Columbia U. Press, N.Y. 584 pages.

Cronquist, A.H., A.H. Holmgren, N.H. Holmgren, J.L. Reveal, and P.K. Holmgren. (1984) *Intermountain Flora, Vascular Plants of the Intermountain West, U.S.A.* Volume 4, Sub-class Asteridae (except Asteraceae). Columbia University Press, N.Y. 573 pp.

Cronquist, A.H., A.H. Holmgren, N.H. Holmgren, J.L. Reveal, and P.K. Holmgren. (1989) *Intermountain Flora, Vascular Plants of the Intermountain West, U.S.A.* Volume 3, Part B. Fabales, by Rupert C. Barneby. The New York Botanical Garden, N.Y. 279 pp.

Cronquist, A.H., A.H. Holmgren, N.H. Holmgren, J.L. Reveal, and P.K. Holmgren. (1994) *Intermountain Flora, Vascular Plants of the Intermountain West, U.S.A.* Volume 5, Asterales by Arthur Cronquist. New York Botanical Garden, N.Y. 496 pp.

2. *Flora of the Pacific Northwest*-- the reference given here is for the one-volume edition, which has since 1973 been the most complete regional flora available to workers in the Northwest. It does not purport to include areas south of the Snake River Plain, but most of the plants found at City of Rocks are listed in this volume. As of late 1996, this flora was still available in the classic large format, six-volume edition.

Hitchcock, C. Leo and Arthur Cronquist (1981). *Flora of the Pacific Northwest, An Illustrated Manual*. University of Washington Press, Seattle, WA. 730 pp.

3. *Idaho Flora*-- though dated, this is still the only statewide flora for Idaho. It has been reprinted in recent years by Brigham Young University Press. Current availability is unknown.

Davis, Ray J. (1952) *Flora of Idaho*. Wm. C. Brown Co., Dubuque, Iowa. 836 pp.

4. *Utah Floras*-- the following two references include nearly all of the City of Rocks plants. The volume by Shaw covers a smaller geographic area and may be less intimidating for the casual botanist than the major flora

Shaw, Richard J. (1989) *Vascular Plants of Northern Utah: An Identification Manual*. Utah State University Press, Logan, Utah. 412 pp.

Welch, S.L., N.D. Atwood, L.C. Higgins and S. Goodrich. (1987) *A Utah Flora*. Great Basin Naturalist Memoir No. 9. Brigham Young University, Provo, Utah. 894 pp. (A recent revision of this work is available from the publisher.)

A Note for Visitors

It can usually be said that June and July are the peak months for flowering plants at City of Rocks. However, a characteristic of the arid Intermountain Region is that the timing and abundance of floral displays varies widely from year to year. The staff at City of Rocks observes natural events closely and can inform visitors on the best times and places to view plants.

Acknowledgements: Sincere appreciation is extended to the following persons: Ned Jackson and his Idaho Parks and Recreation Crew, along with Dave Pugh of the National Park Service, gave me permission to work in the Reserve and provided supplies. Karl Holte of Idaho State University was a primary sponsor of this work, providing supplies, herbarium access, and indispensable library privileges. Kimball T. Harper and Duane Atwood of Brigham Young University gave me unpublished checklists. Alma Winward and Mont Lewis of the US Forest Service in Ogden, Utah, did the same and also provided useful reports. David Charlet generously shared his recently compiled species lists for the Nevada mountains. Mary Barkworth, Utah State University, assisted in identification of certain grasses, made me feel welcome at the Intermountain Herbarium, and help me to obtain a copy of Art Holmgren's classic NE Nevada flora from the 1940's. Ron Hartman, University of Wyoming, kindly examined the collections of *Cymopterus davisii* Hartman, which differ in flower color and other minor characters from the main populations further north. Bob Moseley, Idaho Conservation Data Center, kept me apprised of the status of rare plants in the area and provided useful reports. Thanks to all, and to any whom I have neglected to mention. I welcome correspondence concerning the flora. Present address: Tom John, 9031 West Marigold, Boise, Idaho 83714.

DIVISION LYCOPODIOPHYTA

Selaginellaceae

Selaginella watsonii Underw.

Watson Spikemoss

Quartzite rocks on the southwest face of Graham Peak, pure quartz outcrop in SW4 Sec 31 T15S R24E. Also abundant on quartz outcrop at Castle Rocks.

Polystichum kruckebergii Wagner

Kruckeberg's Sword Fern

Shaded rock clefts on south slope of the ridge between Circle and Graham Creeks. Also at Castle Rocks and fairly common on the Raft River Mountains.

Polystichum scopulinum (D.C. Eaton) Maxon

Western Holly Fern

Protected rock ledges at Twin Sisters.

DIVISION EQUISETOPHYTA

Equisetaceae

Equisetum arvense L.

Field Horsetail

Ditchbanks and meadows NW of Almo.

Equisetum laevigatum A. Br.

Smooth Scouring Rush

Terraces and streambanks along Circle Creek near road crossing. Sometimes among willow clumps and in sagebrush.

DIVISION PINOPHYTA

Cupressaceae

Juniperus osteosperma (Torr.) Little

Utah Juniper

Foothills and sunny slopes to middle elevations. More frost hardy than pinyon pine, and thus extending further into the valley.

Juniperus scopulorum Sarg.

Rocky Mountain Juniper

On rock outcrops and in deeper soils from Bath rock upward in elevation.

DIVISION POLYPODIOPHYTA

Adiantaceae

Pellaea breweri D.C. Eaton

Brewer Cliff-Brake Fern

Rock ledges on Graham Peak and northward.

Pinaceae

Abies lasiocarpa (Hook.) Nutt.

Alpine Fir

From Indian Grove northward in the mountains.

Pinus contorta Dougl. var. *latifolia* Engelm.

Inland Lodgepole Pine

Indian Grove and northward. This pine is near the southwestern extremity of its range.

Aspleniaceae

Cystopteris fragilis (L.) Bernh.

Brittle Bladder Fern

At the base of rock outcrops, on ledges, and along both vernal and perennial streams.

Pinus flexilis James

Limber Pine

On rock outcrops where its seeds are often cached by Nutcrackers and Pinyon Jays. Also on Graham Peak. Several tall specimens are near Emery Canyon Well.

Dryopteris felix-mas (L.) Schott

Male Fern

Known only from a single, deeply shaded rock cleft along the ridge between Circle and Graham Creeks. This plant has a wide range, but is seldom abundant.

Pinus monophylla Torrey & Fremont

Single-Leaf Pinyon

Middle elevations throughout the Reserve. The Albion Mountains mark the northern extremity of this pine's modern range.

Pseudotsuga menziesii (Mirb.) Franco var. *glauca*
(Beissn.) Franco Douglas Fir
On the north-facing slope of Graham Creek Canyon.
Spreading into upper Circle Creek. City of Rocks marks
the westward limit of the present range of Douglas Fir in
the northern Great Basin.

DIVISION MAGNOLIOPHYTA

CLASS MAGNOLIOPSIDA

Aceraceae

Acer glabrum Torr. var. *douglasii* (Hook.) Dippel
Rocky Mountain Maple
Scattered through upper tributaries of Circle Creek and
into Graham Creek Canyon.

Acer negundo L.
Box Elder
Near farmsteads and along streams.

Amaranthaceae

**Amaranthus albus* L.
Tumble Pigweed
Along roadways and in areas where the soil is disturbed.

Amaranthus blitoides Watson
Prostrate Pigweed
Roadsides.

**Amaranthus retroflexus* L.
Redroot Pigweed
Disturbed areas around farmsteads. Near the old rock
house on Circle Creek.

Apiaceae

**Carum carvi* L.
Caraway
Pastures and meadows NW of Almo.

Cicuta maculata L.
Water Hemlock
In and near the waters of Circle Creek.
Cicuta douglasii

**Conium maculatum* L.
Poison Hemlock
Along Circle Creek.

Cymopterus davisii R. L. Hartman
Davis Wavewing
Easterly slope just north of Graham Peak. This plant is
known only from the Albion Mountains.

Cymopterus purpurascens (Gray) Jones
Widewing Spring Parsley
In pinyon-juniper near the east entrance to City of Rocks
and north of Almo.

Heracleum lanatum Michx.
Cow Parsnip
Along streams and ditches NW of Almo.

Lomatium dissectum (Nutt.) Math. & Const. var. *eatonii*
(Coul. & Rose) Cronq.
Giant Lomatium
Bath Rock northward to Emery Canyon well.

Lomatium foeniculaceum (Nutt.) Coult. & Rose var.
macdougalii (Coul. & Rose) Cronq.
Desert Parsley
Rocky areas among sagebrush.

Lomatium nudicaule (Pursh) Coult. & Rose
Barestem Lomatium
Pinyon-juniper near south boundary of Reserve.

Lomatium triternatum (Pursh) Coult. & Rose var.
platycarpum (Torr.) Cronq.
Narrowleaf Lomatium
Among sagebrush, foothills to middle elevations.

Orogenia linearifolia Wats.
Indian Potato
Middle and higher elevations in fertile soils.

Osmorhiza chilensis H. & A.
Sweet Cicely
Aspen groves.

Osmorhiza depauperata Phil.
Blunt Sweet Cicely
Among aspen and fir at Indian Grove.

Osmorhiza occidentalis (Nutt.) Torr.
Sweet Anise
Aspen thickets north of Bath Rock.

**Pastinaca sativa* L.
Wild Parsnip
Ditchbanks and meadows NW of Almo.

Perideridia montana (Blankinship) Cronq.
Yampah
Vernally moist areas near Bath Rock.

Asclepiadiaceae

Asclepias speciosa Torr.
Showy Milkweed
Around farmsteads in and near Almo.

Asteraceae

Achillea millefolium L. var. *lanulosa* (Nutt.) Piper
Yarrow
Valleys to mountain peaks.

Agoseris aurantiaca (Hook.) Greene
Orange Dandelion
Indian Grove and upward in elevation.

Agoseris glauca (Pursh) Raf. var. *dasycephala* (T. & G.) Jeps.
Mountain Dandelion
High meadows near Graham Peak.

Agoseris glauca (Pursh) Raf. var. *glauca*
Mountain Dandelion
Meadows in the valley.

Agoseris glauca (Pursh) Raf. var. *laciniata* (D. C. Eaton) Smiley
Sagebrush grasslands, foothills to middle elevations.

Agoseris heterophylla (Nutt.) Greene
Annual Agoseris
Along vernal stream in SE4 SE4 Sec 35 T15S R23E.

Antennaria dimorpha (Nutt.) T. & G.
Low Pussytoes
In sagebrush and pinyon juniper, foothills to middle

elevations.

Antennaria microphylla Rydb.
Rose Pussytoes
Middle to high elevations.

**Arctium minus* (Hill) Bernh.
Common Burdock
Disturbed areas along seasonal and permanent streams.

Arnica cordifolia Hook.
Heartleaf Arnica
Aspen and fir at Indian Grove.

Arnica sororia Greene
Meadow Arnica
Grassy areas and among aspens near Bath Rock and northward.

Artemisia arbuscula Nutt.
Low Sagebrush
Ridges and slopes with shallow, rocky soils, from foothills to Graham Peak.

Artemisia biennis (Willd.)
Wormwood
Grazed stream bottoms on lower Circle Creek.

Artemisia dracunculus L.
Tarragon
Mixed mahogany, aspen, and pinyon in upper North Circle Creek.

Artemisia ludoviciana Nutt. var. *ludoviciana*
var. *latiloba* Nutt.
var. *incompta* (Nutt.) Cronq.
Western Mugwort, Prairie Sagebrush
Valleys to upper elevations. The varieties are sometimes well segregated and at other times intergradient with one another. An interesting, highly variable population may be found on the south slope of the ridge between Circle Creek and Graham Creek in the SW4 NW4 Sec 29 T15S R24E.

Artemisia nova Nels.
Black Sagebrush
Forming pure stands on foothills. Also mixed with *A. arbuscula* at higher elevations, such as the ridge west of

Indian Grove.

Artemisia tridentata Nutt. subsp. ***tridentata***

Basin Big Sagebrush

Stream terraces, basins, areas with deeper soils.

A. tridentata Nutt. subsp. ***vaseyana*** (Rydb.) Beetle

Mountain Big Sagebrush

Middle to high elevations on gentle terrain or in snow accumulation areas.

Aster ascendens Lindl.

Pacific Aster

Middle elevations among sagebrush and aspens.

Aster foliaceus Lindl.

Leafy Aster

Riparian, in vernal wet areas at Indian Grove.

Aster hesperius Gray

Ditchbank Aster

Lower Circle Creek and in the meadows NW of Almo.

Aster integrifolius Nutt.

Thickstem Aster

Mountain slopes, Indian Grove and northward.

Aster perelegans Nels. & Macbr.

Nuttall Aster

Open slopes above Indian Grove.

Aster scopulorum Gray

Gray Aster

Pinyon-juniper stands on Southwest Hill, near the southern boundary of the Reserve.

Balsamorhiza hookeri Nutt. var. ***hispidula*** (Sharp)

Cronq.

Hooker Balsamroot

Foothills and extending along rocky ridgetops to Indian Grove area.

Balsamorhiza saggitata (Pursh) Nutt.

Arrowleaf Balsamroot

Common on sagebrush slopes and among pinyon-juniper. Foothills to mountain tops.

Brickellia californica (Gray)

California Brickellbrush

South-facing slope of the ridge between Circle and Graham Creeks.

Brickellia grandiflora (Hook.) Nutt.

Tasselflower

Around the base of the rock formations and on ledges and cliffs.

****Centaurea maculosa*** Lam.

Spotted Knapweed

Along roadsides at the lower elevations.

Chaenactis douglasii (Hook.) H. & A.

Dusty Maiden

Sagebrush grasslands and pinyon juniper, usually on dry sites.

Chrysothamnous nauseosus (Pallas) Britt.

subsp. ***albicaulis*** (Nutt.) Hall & Clements

Rubber Rabbitbrush

Foothills to middle elevations, open slopes and grasslands.

C. nauseosus (Pallas) Britt.

subsp. ***consimilis*** (Greene) Hall & Clements

Rubber Rabbitbrush

Valley and foothills.

Chrysothamnous viscidiflorus (Hook.) Nutt.

subsp. ***puberulus*** (D.C. Eaton) Hall & Clements

Green Rabbitbrush

Foothills among sagebrush and on ridges. A favorite food of deer when first greening up in the spring.

C. viscidiflorus (Hook.) Nutt.

subsp. ***lanceolatus*** (Nutt.) Hall & Clements

Green Rabbitbrush

Foothills to mountain peaks.

****Cichorium intybus*** L.

Chicory

Meadows NW of Almo.

****Cirsium arvense* (L.) Scop. var. *horridum* Wimmer & Grab.**
Canada Thistle
Valley meadows and moist sites in the mountains.

***Cirsium neomexicanum* Gray var. *utahense* (Petrak)**
Welsh
Utah Thistle
Sagebrush and pinyon juniper from the foothills to middle elevations.

****Cirsium vulgare* (Savi) Tenore**
Bull Thistle
Disturbed places such as roadsides, overgrazed stream bottoms, livestock gathering places.

****Conyza canadensis* (L.) Cronq.**
Horseweed, Canada Fleabane
Along lower Circle Creek from the road crossing downstream.

***Crepis acuminata* Nutt.**
Tapertip Hawksbeard
Sagebrush grasslands, open slopes, aspen groves.

***Crepis intermedia* Gray**
Grey Hawksbeard
Foothills and open stands of pinyon-juniper.

Crepis modocensis* Greene subsp. *modocensis
Modoc Hawksbeard
Sagebrush areas in Circle Creek basin.

***Erigeron asperugineus* (D.C. Eat.) Gray**
Fleabane
Ridgeline at Graham Peak.

***Erigeron compositus* Pursh var. *glabratus* Macoun**
Fernleaf Fleabane
Rock outcrops and rocky ridges at middle elevations.

***Erigeron divergens* T. & G.**
Spreading Fleabane
Around base of rock formations and along washes in the foothills.

***Erigeron lonchophyllus* Hook.**
Spearleaf Fleabane
Sedge meadow just downslope to the east of Emery Canyon Well.

***Erigeron nanus* Nutt.**
Dwarf Fleabane
Open ridge from Finger Rock upslope nearly to Graham Peak.

***Erigeron peregrinus* (Pursh) Greene subsp. *callianthemus* (Greene) Cronq. var. *eucallianthemus* Cronq.**
Mountain Daisy
Meadows and sagebrush, north slope of Graham Peak and northward in the mountains.

***Erigeron pumilus* Nutt. subsp. *concinoides* Cronq. var. *euconcinoides* Cronq.**
Low Fleabane
Ridges, rock outcrops, and low sagebrush stands.

***Erigeron pumilus* Nutt. subsp. *concinoides* Cronq. var. *condensatus* (D.C. Eaton) Cronq.**
Ridgeline from Finger Rock upslope to the southwest face of Graham Peak.

***Erigeron speciosus* (Lindl.) DC. var. *macranthus* (Nutt.) Cronq.**
Oregon Fleabane
Aspen groves and mesic sites at middle elevations.

***Erigeron tener* Gray**
Thin Daisy
At base of rock outcrops near Finger Rock. Uncommon in the Reserve.

***Eriophyllum lanatum* (Pursh) Forbes var. *integrifolium* (Hook.) Bailey**
Eriophyllum
East-facing slope just north of Graham Peak and northward in the mountains.

***Eupatorium occidentale* Hook.**
Western Eupatorium
On ledges and at the base of cliffs and outcrops along the top of the ridge between Graham and Circle Creeks.

***Gnaphalium palustre* Nutt.**

Cudweed

Along washes and in seasonally wet areas in the foothills.

Grindelia squarrosa* (Pursh) Dunal var. *serrulata

(Rydb.) Steyerf.

Sawtooth Gumweed

Roadsides, campgrounds, gravelly and compacted areas.

***Gutierrezia sarothrae* (Pursh) Britt.**

Broom Snakeweed

Common among sagebrush in foothill areas.

***Haplopappus acaulis* (Nutt.) Gray**

Stemless Goldenweed

Rocky ridges and on rock formations in the foothills and upward to moderate elevations.

***Haplopappus macronema* Gray**

Whitestem Goldenweed

East-facing slope just north of Graham Peak and northward at high elevations.

***Haplopappus nanus* (Nutt.) D. C. Eaton**

Dwarf Goldenweed

Hot, dry ledges on rock formations, low to middle elevation.

***Haplopappus uniflorus* (Hook.) T. & G.**

Meadow Goldenweed

In sedge meadows along Circle Creek above the road crossing.

Pyrrocoma uniflora

***Helianthella uniflora* (Nutt.) D.C. Eaton**

One-Flower Helianthella

Open slopes at middle to high elevations.

***Helianthus annuus* L.**

Common Sunflower

Roadsides and fencelines in the valley and foothills.

***Helianthus nuttallii* T. & G.**

Nuttall Sunflower

Along streams and ditches in the meadows NW of Almo.

***Heterotheca villosa* (Pursh) Shinnars**

Hairy Golden Aster

Around the base of rock formations throughout the Reserve.

Chrysopsis villosa

***Hieracium cynoglossoides* Arv.-Touv.**

Houndstongue Hawkweed

Mahoganies and junipers on south-facing slope just east of Emery Canyon Well.

***Iva axillaris* Pursh**

Poverty Weed

Roadsides and disturbed soils around farmsteads.

***Iva xanthifolia* Nutt.**

Marshelder, Rag Sumpweed

At Circle Creek road crossing.

****Lactuca serriola* L.**

Prickly Lettuce

Roadsides and farmsteads.

***Machaeranthera canescens* (Pursh) Gray**

Hoary Aster

Sagebrush and pinyon-juniper, middle elevations to high ridges.

***Madia glomerata* Hook.**

Tarweed

Disturbed areas, such as the old roadway north of Indian Grove.

***Madia gracilis* (Smith) Keck**

Grassy Tarweed

Along edge of graded road through meadows NW of Almo.

***Microseris nutans* (Geyer) Schulz-Bip**

Nodding Microseris

Pinyon-juniper and sagebrush near south boundary of the Reserve. To be expected in similar habitats elsewhere.

***Rudbeckia occidentalis* Nutt.**

Western Coneflower

Heavily grazed aspen groves and mountain meadows, Indian Grove and northward in the mountains.

Senecio canus Hook.

Grey Groundsel
Ridgeline from Finger Rock northward.

Senecio integerrimus Nutt. var. ***exaltatus*** (Nutt.) Cronq.

Columbia Groundsel
Sagebrush grasslands and open stands of pinyon juniper,
foothills to middle elevations.

Senecio multilobatus T. & G.

Lobeleaf Groundsel
Sagebrush grasslands and pinyon-juniper.

Senecio pseud aureus Rydb.

Groundsel
Vernally wet areas at Indian Grove.

Senecio serra Hook.

Saw Groundsel
Aspen groves and open slopes at higher elevations.

Senecio streptanthifolius Greene

Manyface Groundsel
Along the ridge between Circle and Graham Creeks.

Solidago canadensis L.

Canada Goldenrod
Ditchbanks and fencerows in the meadows NW of Almo.

Solidago missouriensis Nutt.

Missouri Goldenrod
Moist, sandy terrace east of Emery Canyon summit.

Solidago sparsiflora Gray

Slender Goldenrod
At the base of rock outcrops and on ledges in the rock
formations.

****Sonchus asper*** (L.) Hill

Prickly Sow Thistle
Along Circle Creek below the road crossing.

Stephanomeria spinosa (Nutt.) Tomb.

Thorn Wirelettuce
Sagebrush flats and roadsides in the Basins.

Stephanomeria tenuifolia (Torr.) Hall var. ***myrioclada***

(Eat.) Cronq.
Wirelettuce
At the base of rock formations and on ledges.

Taraxacum officinale Weber

Dandelion
Grassy areas and streamsides.

Tetradymia canescens DC.

Horsebrush
Ridgeline west of Indian Grove.

****Tragopogon dubius*** Scop.

Yellow Salsify
Roadsides and disturbed places from the foothills to
relatively high elevations.

****Tragopogon porrifolius*** L.

Purple Salsify
Meadows NW of Almo.

Wyethia amplexicaulis (Nutt.) Nutt.

Mule's Ear
Scattered and fairly uncommon. Emery Canyon near
junction of Almo Park road, and on the northeasterly
slope just north of the junction of Twin Sisters and Emery
Canyon Road.

Xanthium strumarium L.

Common Cocklebur
Roadsides.

Berberidaceae

Berberis repens Lindl.

Oregon Grape
Aspen groves and Douglas Fir, also in mesic areas among
Pinyon-Juniper. *Mahonia repens*

Betulaceae

Alnus incana (L.) Moench subsp. ***rugosa*** (Duroi) R.T.

Clausen var. ***occidentalis*** (Dippel) C.L. Hitchcock
Mountain Alder
Along Emery Canyon Creek.

Boraginaceae

Amsinckia menziesii (Lehm.) Nels. & Macbr.
Fiddleneck
A roadside weed near Circle Creek.
Amsinckia retrorsa

Asperugo procumbens L.
Catchweed
Fencerows and farmsteads.

Cryptantha ambigua (A. Gray) Greene
Wilkes Cryptantha
Pinyon-juniper areas.

Cryptantha circumcissa (H. & A.) Johnston
Cushion Cryptantha
Dry, sandy areas. Around anthills.

Cryptantha humilis (Greene) Payson
Dwarf Cryptantha
Pinyon-juniper stands, mostly in the foothills.

Cryptantha watsonii (Gray) Greene
Watson Cryptantha
Pinyon-juniper and upward to aspen groves.

Hackelia floribunda (Lehm.) I.M. Johnston
Forget-me-not
Aspen groves and alpine fir stands.

Hackelia macrantha (Eastw.) J. Gentry
Forget-me-not, Stickseed
Upper elevation woods and openings.

Hackelia patens (Nutt.) I.M. Johnston
Spotted Forget-me-not
Foothills to middle elevations on open slopes.

Lappula redowski (Hornem.) Greene
Desert Stickweed
Roadsides and disturbed areas.

Lithospermum ruderale Dougl.
Western Stoneseed
Sagebrush and pinyon-juniper from the foothills to middle elevations.

Mertensia ciliata (Torr.) G. Don
Bluebell
Aspen groves and mesic slopes at higher elevations.

Mertensia oblongifolia (Nutt.) G. Don
Sagebrush Bluebell
Blooming early in sagebrush areas from foothills to middle elevations.

**Myosotis micrantha* Pallas
Forget-me-not
Vernally moist areas, mostly lower elevations.

Pectocarya penicillata (Hook. & Arn.) DC.
Northern Pectocarya
Among sagebrush in the Twin Sisters area.

Plagiobothrys scouleri (Hook. & Arn.) Johnst. var.
penicillatus (Greene) Cronq.
Popcorn Flower
Meadows and seeps from the valley to Indian Grove.

Brassicaceae

**Alyssum desertorum* Stapf.
Desert Alyssum
Sagebrush and Pinyon-juniper, low to middle elevations.

Arabis drummondii Gray
Rockcress
Alpine fir forests near Graham Peak.

Arabis glabra (L.) Bernh.
Tower Mustard
Aspen groves and meadows at upper elevations.

Arabis hirsuta (L.) Scop.
var. *pyncocarpa* (Hopkins) Rollins var. *glabrata* T. & G.
Hairy Rockcress
Along vernal stream in Sec 29 T15S R24E. The first variety grows in dryer sites and the second along the stream.

Arabis holboellii Hornem. var. *secunda* (Howell) Jepson
Rockcress
Pinyon-Juniper and sagebrush throughout the Reserve.

Arabis lignifera Nels.

Rockcress

South-facing slopes near the southern boundary of the Reserve. Closely similar to *A. holboellii* and perhaps belonging to var. *pinetorum* of that species.

Arabis microphylla Nutt.

Littleleaf Rockcress

Rock ledges and clefts throughout the Reserve.

Arabis sparsiflora Nutt.

Sicklepod Rockcress

Pinyon-juniper and sagebrush mainly lower elevations.

Barbarea orthoceras Ledeb.

Winter Cress

Riparian areas at middle elevations.

****Camelina microcarpa*** Andr.

False Flax

Roadsides and in burned areas at lower elevations.

****Capsella bursa-pastoris*** (L.) Medicus

Shepherd's Purse

Farmsteads, roadsides, livestock use areas.

Cardamine pennsylvanica Muhl.

Bittercress

Riparian areas and mountain seeps.

****Cardaria pubescens*** (Meyer) Jarm.

Hairy Whitetop

A roadside weed.

Caulanthus crassicaulis (Torr.) Wats.

Thickstem Wild Cabbage

Pinyon-juniper and sagebrush grasslands.

****Chorispora tenella*** (Pallas) DC.

Musk Mustard, Purple Mustard

Farmsteads, roadsides, disturbed places.

Descurainia californica (Gray) Schulz

California Tansy Mustard

Sagebrush grasslands to aspen groves at middle elevations. This plant varies greatly in abundance from year to year.

Descurainia pinnata (Walt.) Britt. var. *filipes* (Gray)

Peck

Tansy Mustard

Although scattered throughout the foothill and middle elevations, the typical habitat for this plant is in the needle duff around Pinyons and Junipers on sunny sites.

Descurainia richardsonii (Sweet) Shulz var. *brevipes*

(Nutt.) Welsh & Reveal

Richardson Tansy Mustard

Aspen and alpine fir, from Indian Grove northward in the mountains.

Descurainia richardsonii (Sweet) Shulz var. *sonnei*

(Robins) C.L. Hitchcock

Richardson Tansy Mustard

Open slopes, aspen groves, and livestock congregating areas at middle to high elevations.

****Descurainia sophia*** (L.) Webb

Flixweed Tansy Mustard

Roadsides, disturbed places in valleys and foothills.

Draba nemorosa L.

Woods Draba

In soil pockets on the rock formations and in openings among pinyon-juniper stands.

Draba verna L.

Spring Draba

Diminutive, early-blooming annual found from the foothills to middle elevations.

Erysimum asperum (Nutt.) DC.

Wallflower

Sagebrush grasslands, pinyon juniper, and open slopes.

****Lepidium campestre*** (L.) R. Br.

Fieldcress

Ditchbanks and riparian areas NW of Almo.

****Lepidium perfoliatum*** L.

Clasping Pepperweed

Farmsteads and livestock gathering areas at lower elevations. Common around the old Stage Station.

Lepidium virginicum L. var. *pubescens* (Greene) Hitchc.
Virginia Pepperweed
Livestock bedding areas in the Pinyon-Juniper.

Nasturtium officinale R. Br. in Ait.
Watercress
In slow-moving sections of Circle Creek.

Rorippa curvisiliqua (Hook.) Bessey
Curved Yellowcress
Riparian areas at middle elevations. Collected by Ray Davis at Emery Canyon Creek in 1934 and still growing there.

Schoenocrambe linifolia (Nutt.) Greene
Plains Mustard
Sagebrush and Pinyon-juniper from foothills to middle elevations.

**Sisymbrium altissimum* L.
Tumble Mustard, Jim Hill Mustard
A common associate of cheatgrass in burned areas.
Thlaspi arvense L.
Pennycress, Fanweed
Roadsides, farmsteads, disturbed places.

Thlaspi montanum L.
Wild Candytuft
Open areas from Graham Peak northward in the mountains.

Cactaceae

Opuntia polyacantha Haw.
Plains Prickly Pear
Common throughout the Reserve, reaching to moderate elevations on ridgelines.

Pediocactus simpsonii (Engelm.)
Simpson Hedgehog Cactus
Locally abundant along the ridgeline west of Indian Grove and upward.

Caprifoliaceae

Sambucus cerulea Raf.
Blue Elderberry

Scattered individual plants may be found from Twin Sisters through the rock formations and near Finger Rock.

Sambucus racemosa L. var. *microbotrys* (Rydb.) Kearney & Peebles
Red Elderberry
Meadows and open slopes from Indian Grove northward in the mountains.

Symphoricarpos oreophilus Gray
Snowberry
Foothills to mountain tops.

Caryophyllaceae

Arenaria fendleri Gray
Sandwort
Rocky ridges at middle to high elevations.
Arenaria kingii

Arenaria congesta Nutt.
Ballhead Sandwort
Graham Peak and northward.

Cerastium nutans Raf.
Nodding Chickweed
Moist areas along wash east of Emery Canyon Well.

Lychnis drummondii (Hook.) Wats.
Drummond Catchfly
Alpine fir forest at Indian Grove and northward.

Silene douglasii Hook.
Douglas Silene
Lee slope of ridge north of Graham Peak.

Silene menziesii Hook. var. *menziesii*
Catchfly
Aspen groves at middle and higher elevation.

Silene menziesii Hook. var. *viscosa* (Greene) Hitchc. & Mag.
Catchfly
Pinyon juniper on north-facing or other mesic sites, mostly foothills.

Stellaria crispa Cham. & Schlecht.
Curled Starwort
Vernally wet areas at Indian Grove.

Stellaria jamesiana Torr.
Sticky Starwort
Middle and upper elevation, from Pinyon-juniper to aspen and fir.

Stellaria longipes Goldie
Longstalk Starwort
Sedge meadows along Circle Creek. Riparian areas.

****Spergularia rubra* (L.) Presl.**
Red Sandspurry
Along road edges and other disturbed places at higher elevations.

Chenopodiaceae

Atriplex patula L. var. ***hastata*** (L.) Gray
Fat Hen Saltbush
Farmsteads, roadsides, and vernally moist areas in the foothills and valley.

Atriplex rosea L.
Tumbling Orach
Roadsides and disturbed places.

****Chenopodium album*** L.
Lambsquarter
Fencelines, farmsteads, and roadsides at lower elevation.

Chenopodium capitatum (L.) Asch. var. ***parvicapitatum***
Welch
Mountain Goosefoot
Around the base of rock outcrops in upper Emigrant Basin.

Chenopodium glaucum L.
Oakleaf Goosefoot
Around cattle watering troughs and salt licks.

****Halogeton glomeratus*** (Bieb.) Mey.
Halogeton
Roadsides and heavily grazed areas in the foothills and valley.

****Kochia scoparia*** (L.) Schrad.
Summer Cypress
Disturbed areas in the foothills and valley. At the old Stage Station in Emigrant Canyon.

Monolepis nuttalliana (Schultes) Greene
Nuttall Poverty Weed
Along cattle trails, at salt licks, and near watering troughs.

****Salsola iberica*** Sennen & Pau
Russian Thistle
Roadsides and disturbed places.

Sarcobatus vermiculatus (Hook.) Torr.
Greasewood
Saline areas on stream terraces and in the valley.

Clusiaceae

Hypericum formosum H.B.K. var. ***scouleri*** (Hook.)
Hitchcock
Western St. Johnswort
Along streams and irrigation ditches in the meadows NW of Almo. Also Indian Grove.

Convolvulaceae

Convolvulus arvensis L.
Field Bindweed, Morning Glory
A weed in fields and roadsides.

Cornaceae

Cornus sericea L.
Redosier Dogwood
Along the moist wash east of Emery Canyon Well.
Cornus stolonifera

Crassulaceae

Sedum lanceolatum Torr.
Lanceleaved Stonecrop
Along rocky ridge upward from Finger Rock.

Fabaceae

Astragalus agrestis Dougl.

Field Milkvetch

Stream terraces along Circle Creek. Also along the road east of Finger Rock.

Astragalus beckwithii Torr. & Gray

Beckwith Milkvetch

Sagebrush grasslands, low to middle elevation.

Astragalus calycosus Torr. ex S. Wats.

Torrey Milkvetch

Among pinyon-juniper in the foothills and recurring along the ridgeline from Finger Rock to Indian Grove.

Astragalus cibarius Sheld.

Browse Milkvetch

Sagebrush grasslands and pinyon-juniper.

Astragalus convallarius Greene

Skeleton Milkvetch

Sagebrush grasslands, foothills to middle elevations.

Astragalus lentiginosus Dougl. ex Hook. var. *salinus*

(Howell) Barneby

Freckled Milkvetch

Foothills in sagebrush grasslands and pinyon-juniper.

Astragalus purshii Dougl. ex Hook. var. *purshii*

Pursh Milkvetch

Pinyon-juniper and sagebrush grasslands.

Astragalus tenellus Pursh

Pulse Milkvetch

Open ridge and slopes from Finger Rock northward.

Glycyrrhiza lepidota Pursh

Wild Licorice

Meadows and rocky places along streams in the foothills and valley.

Lupinus argenteus Pursh var. *argentatus* (Rydb.)

Barneby

Silver Lupine

Middle to high elevations in meadows and on mesic slopes. Yielding to the following variety on drier sites and at lower elevations.

Lupinus argenteus Pursh var. *holosericeus* (Nutt.)

Barneby

Silver Lupine

Foothills to moderate elevation in sagebrush, meadows, and open slopes.

Lupinus leucophyllus Dougl.

Whiteleaved Lupine

Sagebrush grasslands throughout the middle elevations.

Especially common in upper Emery Canyon.

****Medicago lupulina*** L.

Black Medic

Meadows and riparian areas.

****Medicago sativa*** L.

Common Alfalfa

Seeded and semi-naturalized throughout the lower part of the Reserve.

****Melilotus alba*** Medicus

White Sweetclover

Roadsides and disturbed places.

****Melilotus officinalis*** (L.) Pallas

Yellow Sweetclover

Roadsides and disturbed places.

Thermopsis rhombifolia (Nutt.) Richards

Thermopsis, Yellow Pea

Meadows along Circle Creek and NW of Almo.

Thermopsis montana Nutt.

Trifolium cyathiferum Lindl.

Cup Clover

Vernally wet areas, riparian. Mostly middle to higher elevation. Common at Indian Grove.

Trifolium microcephalum Pursh

Littlehead Clover

Seep areas and along vernal streams.

****Trifolium pratense*** L.

Red Clover

Introduced in pasture seedings and now quite naturalized in the meadowed riparian areas.

****Trifolium repens* L.**

White Clover

Common in meadows and riparian areas.

***Trifolium variegatum* Nutt.**

Variegated Clover

Wet areas along Circle Creek and in the meadows NW of Almo.

Fumariaceae

***Dicentra uniflora* Kell.**

Steershead

This distinctive flower blooms very early and is easily missed because it grows in leaf litter. At City of Rocks it seems to be most common in sparse thickets of Mountain Mahogany.

Gentianaceae

***Frasera speciosa* Dougl.**

Green Gentian, Elkweed

Snowpocket in the lee of the ridge west of Indian Grove.

More common in meadows north of Graham Peak.

Swertia radiata

***Gentiana affinis* Griseb.**

Rocky Mountain Gentian

Stream banks along Almo Creek. Uncommon.

Geraniaceae

***Erodium cicutarium* (L.) L'Her.**

Storksbill, Filaree

A weed in disturbed areas of the sagebrush flats and valley areas.

***Geranium viscosissimum* Fisch. & Mey.**

var. ***nervosum*** (Rydb.) Hitchc.

Meadows from the valleys to upper elevations.

Grossulariaceae

***Ribes aureum* Pursh**

Golden Currant

Along washes and streams and at base of rock outcrops. Common in foothills and thinning out with elevation. Tasty fruits.

***Ribes cereum* Dougl. var. *inebrians* (Lindl.) Hitchc.**

Squaw or Wax Currant

Around rock outcrops and scattered through upper Pinyon-Juniper areas. Also in aspen groves.

Tasteless fruits.

***Ribes montigenum* McClatchie**

Alpine Prickly Currant

In Alpine fir thickets, Indian Grove and northward in the mountains.

***Ribes setosum* Lindl.**

Missouri Gooseberry

Mesic areas at low elevations. Near the base of rock formations. Browsed by cattle and deer so only occasionally bearing fruits.

***Ribes viscosissimum* Pursh**

Sticky Currant

Indian Grove and northward in the mountains.

Hydrophyllaceae

***Hesperochiron californicus* (Benth.) Wats.**

California Hesperochiron

Meadows NW of Almo. This plant is rare during average or dry years, but appears in great abundance in meadows and moist areas following snowy winters.

***Hydrophyllum capitatum* Dougl. ex Benth. var. *alpinum* Wats.**

Ballhead Waterleaf

Aspen groves and slopes at middle elevations.

***Nemophila breviflora* Gray**

Basin Nemophila

Aspen groves, especially in areas used heavily by livestock.

***Phacelia hastata* Dougl. ex Lehm.**

Cordilleran Phacelia

Around the base of rock formations.

Lamiaceae

***Agastache urticifolia* (Benth.) Kuntze**

Horsemint

Aspen groves and open slopes middle to high elevations.

***Dracocephalum parviflorum* Nutt.**

Small-Flowered Dragon Head

Known only from Indian Grove following the wet spring of 1991. The area where this plant was found was not grazed by livestock until August that year, due to the persistence of green forage at lower elevations. The present status of this plant in the Reserve is unknown.

****Marrubium vulgare* L.**

Horehound

Roadsides and disturbed places, foothills to middle elevations. Common near Emery Canyon Well and the Stagecoach Station.

***Mentha arvensis* L.**

Field Mint

Riparian areas, wet meadows.

****Nepeta cataria* L.**

Catnip

In the wash just east of Emery Canyon Well.

***Prunella vulgaris* L.**

Common Selfheal

Riparian meadows and streamsides.

Limnanthaceae

***Floerkia proserpinicoides* Willd.**

False Mermaid

In and near vernal streams and seep areas.

Linaceae

***Linum lewisii* Pursh**

Wild Flax, Blue Flax

Foothills to moderate elevations on open slopes, in meadows, and along roadways. *Linum perenne* L.

Loasaceae

***Mentzelia albicaulis* Dougl.**

Whitestem Blazing Star

Pinyon-juniper woods, open slopes at low to middle elevation.

Malvaceae

***Iliamna rivularis* (Dougl.) Greene**

Mountain Hollyhock

Aspen groves and open slopes from Finger Rock northward.

****Malva neglecta* Wallr.**

Roundleaf Mallow

A weed of roadsides and around farmsteads.

***Sidalcea neomexicana* Gray**

New Mexico Checkermallow

Aspen groves.

***Sphaeralcea grossulariifolia* (H. & A.) Rydb.**

Gooseberry-Leaved Globe Mallow

Sagebrush grasslands and pinyon-juniper from foothills to the valley.

Onagraceae

***Camissonia parvula* (Nutt.) Raven**

Little Camissonia

Sagebrush grasslands near Twin Sisters. A tiny plant that is almost invisible except in wet years.

***Camissonia subacaulis* (Pursh) Raven**

Suncups, Stemless Camissonia

Meadows at Indian Grove.

Oenothera heterantha

***Epilobium brachycarpum* Presl.**

Panicled Willow Herb

Widespread from middle to moderate elevation.

Common just north of Bath Rock.

***Epilobium ciliatum* Raf.**

Willow Herb

Riparian areas and vernal springs and seeps.

***Gayophytum decipiens* Lewis & Szecyk**

Groundsmoke

Old fields and nearby pinyon-juniper near the east entrance to City of Rocks Reserve.

Gayophytum diffusum T. & G.

Groundsmoke

Sagebrush openings among aspen groves.

Gayophytum ramosissimum Nutt.

Groundsmoke

Roadsides and open slopes at higher elevations.

Oenothera biennis L.

Common Evening Primrose

Ditchbanks and meadows in the valleys.

Oenothera caespitosa Nutt. var. ***marginata*** (Nutt.)

Munz

Evening Primrose

Scattered populations on south-facing slopes in the foothills. A group of plants just north of the former gravel pit (near east entrance) produces huge flowers in wet years.

Orobanchaceae

Orobanche fasciculata Nutt.

Clustered Broomrape

A parasite on sagebrush in the foothills to middle elevations.

Paeoniaceae

Paeonia brownii Dougl.

Brown's Peony, Wild Peony

Aspen and pinyon-juniper at middle elevations.

Plantaginaceae

****Plantago lanceolata*** L.

English Plantain

Valleys to middle elevations in meadows and along streams.

Plantago major L.

Meadows and riparian areas from valleys to middle elevations.

Polemoniaceae

Collomia linearis Nutt.

Narrowleaf Collomia

Foothills to Graham Peak.

Eriastrum sparsiflorum (Eastw.) H. Mason var. ***wilcoxii*** (A. Nels.) Cronq.

Great Basin Eriastrum

Sagebrush grasslands near Twin Sisters and southward.

Gilia aggregata (Pursh) Sprengel var. ***macrosiphon***

Kearney & Peebles

Scarlet Gilia

Middle to upper elevations on open slopes and roadcuts.

Ipomopsis aggregata

Gilia inconspicua (Smith) Sweet

Shy Gilia

Sagebrush grasslands in Emigration Basin.

Gilia tenerrima A. Gray

Soft Gilia

Pinyon-juniper stands and around rock formations.

Especially common near Twin Sisters

Leptodactylon pungens (Torr.) Nutt.

Prickly Phlox

Open ridges among sagebrush, foothills to moderate elevations.

Linanthus harknessii (Curran) Greene

Three-Seed Linanthus

Sagebrush grasslands near Twin Sisters.

Microsteris gracilis (Hook.) Greene var. ***humilior*** (Hook.) Cronq.

Microsteris

Abundant in sagebrush grasslands and pinyon juniper to moderately high elevations. Common around anthills.

Navarettia intertexta (Benth.) Hook. var. ***propinqua*** (Suksd.) A. Brand

Great Basin Navarettia

Meadows and grassy slopes, Emery Canyon and eastward toward Bath Rock.

Phlox hoodii Richards var. ***canescens*** (T. & G.) Peck

Carpet Phlox

Foothills to middle elevations in sagebrush and pinyon-juniper.

Phlox longifolia Nutt.

Longleaf Phlox

Sagebrush grasslands, openings in pinyon-juniper woods from valleys to moderate elevations.

Phlox multiflora Nels.

Rocky Mountain Phlox

Graham Peak and northward in the mountains.

Phlox pulvinata (Wherry) Cronq.

Cushion Phlox

Graham Peak and windswept ridges northward.

Polemonium pulcherrimum Hook. var. ***pulcherrimum***

Jacob's Ladder

Alpine fir forest at Indian Grove and northward.

Polygonaceae

Eriogonum cernuum Nutt.

Nodding Buckwheat

Roadsides and around the base of rock outcrops in the foothills to middle elevations.

Eriogonum heracleoides Nutt.

Whorled Buckwheat

Sagebrush in the Basins and upward on mountain slopes to high elevations.

Eriogonum macrothecum Nutt. var. ***laxiflorum*** Hook.

Slender Buckwheat

Sagebrush grasslands, pinyon-juniper and open slopes to moderate elevations.

Eriogonum ovalifolium Nutt.

Cushion Buckwheat

Open places in the foothills.

Eriogonum umbellatum Torr.

Sulfur Buckwheat

Sagebrush grasslands, pinyon juniper, then upward on open slopes to the mountain peaks.

****Polygonum aviculare*** L.

Prostrate Knotweed

A weed of roadsides and farmsteads.

Polygonum bistortoides Pursh

Meadow Bistort

Meadows at Emery Canyon and northward.

Polygonum douglasii Greene var. ***douglasii***

Douglas Knotweed

Sagebrush slopes and open areas from middle to high elevation.

Polygonum douglasii Greene var. ***latifolium*** (Engelm.)

Greene

Douglas Knotweed

A taller, more robust and broader-leaved variant. Mesic areas such as meadows at Indian Grove, lodgepole and aspen thickets.

Rumex crispus L.

Curly Dock

Meadows and riparian areas from the valleys to middle elevation.

Rumex paucifolius Nutt.

Alpine Sorrel

Meadows at Emery Canyon and northward.

Rumex salicifolius Weinm. subsp. ***triangulivalvis***

Danser

Willowleaf Dock

Along washes and areas where water accumulates such as cattle guards.

Portulacaceae

Calyptridium umbellatum (Torr.) Greene

Pussy Paws

East-facing slope north of Graham Peak.

Spraguea umbellata

Claytonia lanceolata Pursh

Spring Beauty

From the vicinity of Bath Rock upward in the mountains to the alpine fir forests.

Claytonia perfoliata Donn.

Miner's Lettuce

Mesic sites from the foothills to moderate elevations.

Montia perfoliata

Lewisia pygmaea (Gray) Robins

Least Lewisia

Snowdrift areas on the west flank of Graham Peak. More common northward on the higher peaks.

Montia chamissoi (Ledeb.) Rob. & Fern.

Water Springbeauty

In and along streams and seeps.

Montia fontana L. var. ***tenerrima*** (Gray) Fern. & Wieg.

Littleseed Miner's Lettuce

Vernal stream in SE4 NW4 Sec 29 T15S R24E. Not seen elsewhere, though to be expected in similar habitats.

Montia linearis (Dougl.) Greene

Narrowleaf Miner's Lettuce

Vernally flooded areas in the meadows NW of Almo.

Primulaceae

Dodecatheon pulchellum (Raf.) Merr.

Shooting Star

Along vernal stream in SE4NW4 Sec 29 T15S R24E.

Glaux maritima L.

Common Sea Milkwort

Saline riparian areas along Circle Creek.

Pyrolaceae

Pyrola secunda L.

One-Sided Wintergreen

Indian Grove northward. Rare and hard to find; more common at higher elevations.

Ranunculaceae

Aconitum columbianum Nutt.

Monkshood

Along Emery Canyon Creek and near seeps.

Actaea rubra (Ait.) Willd.

Baneberry

Rather uncommon, known from a few seep areas near Bath Rock.

Aquilegia coerulea James

Colorado Columbine

Alpine fir forests from Graham Peak northward.

Aquilegia formosa Fisch.

Western Columbine

Streambanks and seep areas from the valleys to middle elevations.

Ceratocephalus testiculatus (Crantz) Roth.

Bur Buttercup

Valleys to middle elevations, mostly in disturbed places.

Ranunculus testiculatus

Clematis ligusticifolia Nutt. in T. & G.

Western Virgin's Bower

Around the base of rock formations at Twin Sisters.

Delphinium andersonii Gray

Anderson Larkspur

Sagebrush and pinyon-juniper, mainly south of Twin Sisters.

Delphinium depauperatum Nutt.

Slim Larkspur

Moist stream terraces and meadows.

Delphinium nuttallianum Pritz.

Nuttall Larkspur

Common in sagebrush and openings among pinyon-juniper from foothills to middle elevations.

Delphinium occidentale Wats.

Tall Larkspur

Aspen groves, meadows, and open slopes from Finger Rock northward.

Myosurus minimus L.

Mousetail

In and along vernal stream in SE4NW4 Sec 29 T15S R24E.

Ranunculus andersonii Gray

Pink Buttercup

Mostly on open, sparsely vegetated slopes from the foothills to middle elevations. One of the earliest plants to bloom at City of Rocks.

***Ranunculus aquatilis* L.**

Water Buttercup

Growing in lower Circle Creek.

***Ranunculus glaberrimus* Hook. var. *ellipticus* Greene**

Sagebrush Buttercup

Common early blooming plant in sagebrush and pinyon-juniper from foothills to middle elevations.

***Ranunculus macounii* Britt.**

Macoun Buttercup

Riparian areas.

***Ranunculus sceleratus* L.**

Celery-Leaved Buttercup

Along lower Circle Creek and near the spring at the Stagecoach Station.

***Thalictrum fendleri* Engelm.**

Fendler Meadowrue

Aspen groves.

Rhamnaceae

***Ceanothus velutinus* Dougl.**

Snowbrush Ceanothus

In the lee of high ridges.

Rosaceae

***Amelanchier alnifolia* Nutt.**

Serviceberry

Shady, moist places near seeps.

***Amelanchier utahensis* Koehne**

Utah Serviceberry

Open ridges, rock formations, and pinyon-juniper areas to moderate elevations.

***Cercocarpus ledifolius* Nutt.**

Mountain Mahogany

Around rock formations and on upper slopes and ridges.

***Geum macrophyllum* Willd. var. *perincisum* (Rydb.)**

Raup.

Largeleaf Avens

Riparian areas and seeps.

***Holodiscus dumosus* (Nutt.) Heller**

Rock Spiraea, Mountain Spray

On and around rock formations.

***Potentilla anserina* L.**

Silverweed Cinquefoil

Meadows along lower Circle Creek.

***Potentilla arguta* Pursh**

Tall Cinquefoil

Open slopes from Indian Grove northward.

***Potentilla biennis* Greene**

Biennial Cinquefoil

Around the base of rock formations, especially at Twin Sisters and to the southwest.

***Potentilla glandulosa* Lindl. var. *intermedia* (Rydb.)**

Hitchc.

Gland Cinquefoil

In rock crevices, on ledges, mainly the shadier exposures of outcrops at low and middle elevation.

***Potentilla gracilis* Dougl. var. *pulcherrima* (Lehm.)**

Fern.

Showy Cinquefoil

Meadows at Emery Canyon.

***Prunus virginiana* L. var. *melanocarpa* (A. Nels.) Sarg.**

Chokecherry

Around rock formations, washes, and open slopes.

***Purshia tridentata* (Pursh) DC.**

Bitterbrush

Sagebrush grasslands and open slopes from the foothills to moderate elevations.

***Rosa woodsii* Lindl. var. *ultramontana* (Wats.) Jeps.**

Wood's Rose

Foothills to moderate elevations, sometimes climbing in pinyon or juniper trees.

Rubiaceae

***Galium aparine* L.**

Catchweed Bedstraw

Around the base of pinyons and junipers and beneath sagebrush on shadier slopes.

Galium bifolium S. Wats.
Twinleaf Bedstraw
Meadows and riparian areas.

Galium triflorum Michx.
Sweetscented Bedstraw
Among willow thickets along lower Circle Creek.

Salicaceae

**Populus alba* L.
White Poplar
Around farmsteads in the valley.

Populus angustifolia James
Narrowleaf Cottonwood
Scattered through the Reserve near springs and along vernal streams. Most abundant along the vernal stream in the center of Sec29 T15S R24E. The few cottonwoods remaining are being overtaken by pinyon and juniper in response to a declining water table.

**Populus x canadensis* Moench.
Carolina Poplar
Introduced around farmsteads. Near the old rock house at Circle Creek crossing.

Populus tremuloides Michx.
Quaking Aspen
In the rock formations, Circle Creek, and upward throughout the mountains.

Salix boothii Dorn
Booth Willow
Circle Creek and riparian areas NW of Almo.

Salix drummondiana Barratt
Drummond Willow
Along Emery Canyon Creek mixed with alders.

Salix exigua Nutt. subsp. *exigua* var. *stenophylla* (Rydb.) Schneid.
Sandbar Willow
Lower Circle Creek and along the wash east of Emery Canyon Well.

Salix geeyeriana Anderss.
Geyer Willow
Circle Creek and riparian areas NW of Almo.

Salix lasiandra Benth.
Whiplash Willow
Riparian areas. Becoming almost tree-like along Almo Creek.

Salix lutea Nutt.
Yellow Willow
Circle Creek and other riparian areas.

Salix scouleriana Barratt
Scouler Willow
Scattered through the aspen groves, particularly around seeps and vernal wet areas.

Santalaceae

Commandra umbellata (L.) Nutt. var. *pallida* (DC.) Jones
Bastard Toadflax
Widespread in sagebrush areas.

Saxifragaceae

Heuchera cylindrica Dougl. var. *alpina* Wats.
Roundleaf Alumroot
Graham Peak and northward.

Heuchera parvifolia Nutt. var. *utahensis* (Rydb.) Garrett
Utah Alumroot
Rock outcrops at middle elevations.

Heuchera rubescens Torr.
Pink Alumroot
Everywhere on the rock outcrops.

Lithophragma glabrum Nutt.
Fringecup Woodland Star
Sagebrush and pinyon-juniper to middle elevation.
Lithophragma bulbifera

Lithophragma parviflorum (Hook.) Nutt.
Smallflowered Woodland Star
Sagebrush, banks of vernal streams, pinyon-juniper.

***Lithophragma tenellum* Nutt.**

Slender Woodland Star

Sagebrush and pinyon-juniper.

Scrophulariaceae

***Castilleja angustifolia* (Nutt.) G. Don var. *dubia* A.**

Nels.

Desert Paintbrush

With Basin Big Sagebrush in the foothills to the basins.

Castilleja chromosa

Castilleja angustifolia* (Nutt.) G. Don var. *flavescens

(Pennell) N. Holmgren

Northwestern Paintbrush

Along the ridge from Finger Rock to Indian Grove.

***Castilleja exilis* A. Nels.**

Annual Paintbrush

Along Little Cove Creek (intermittent) and in meadows eastward. Abundant following snowy winters, otherwise uncommon in the Reserve.

***Castilleja flava* Wats.**

Yellow Paintbrush

Foothills to moderate elevations in the sagebrush.

***Castilleja linariifolia* Benth.**

Wyoming Paintbrush

Among sagebrush. Most common on the north-facing slope of Southwest Hill near the southern boundary of the Reserve.

***Castilleja miniata* Dougl. ex Hook.**

Scarlet Paintbrush

Graham Peak and northward in the mountains.

Castilleja pallescens* (Gray) Greenman var. *inverta

(Nels. & Macbr.) Edwin

Pale Paintbrush

Rocky, windswept ridge at Graham Peak and northward.

***Collinsia parviflora* Dougl. ex Lindl.**

Blue-Eyed Mary, Chinese House

Foothills to moderate elevations in numerous habitats.

***Cordylanthus ramosus* Nutt. ex Benth.**

Bushy Bird's Beak

Foothills and valleys in sagebrush. Abundant following wet winters.

***Limosella aquatica* L.**

Mudwort

In and around overflow pond near cattle trough NE of Twin Sisters.

***Mimulus guttatus* DC.**

Yellow Monkey Flower

Springs, seeps, riparian areas and vernal streams.

***Mimulus lewisii* Pursh**

Lewis Monkey Flower

Near the spring in Indian Grove.

***Orthocarpus hispidus* Benth.**

Owl Clover

Ditchbanks and meadows NW of Almo.

***Orthocarpus luteus* Nutt.**

Yellow Owl Clover

Along irrigation ditch at Little Cove Creek.

***Pedicularis contorta* Benth.**

White-Coiled Lousewort

East-facing slope just north of Graham Peak.

***Penstemon attenuatus* Dougl. ex Lindl.**

var. *militaris* (Greene) Cronq.

Taperleaved Penstemon

Aspen groves and open slopes at moderate to high elevations.

***Penstemon cyananthus* Hook. var. *subglaber* (Gray) N.**

Holmgren

Wasatch Penstemon

Foothills to moderate elevations. Locally abundant north of Finger Rock along the road.

***Penstemon humilis* Nutt. ex A. Gray**

Low Penstemon

Pinyon-juniper, sagebrush, and rock outcrops from the foothills to middle elevations.

Penstemon radicosus A. Nels.
Matroot Penstemon
Sagebrush slopes on Southwest Hill.

Penstemon rydbergii A. Nels.
Rydberg Penstemon
Meadows from Emery Canyon north through Indian Grove and into the higher mountains.

Scrophularia lanceolata Pursh
Lanceleaf Figwort
Aspen groves and open slopes from Finger Rock northward.

Verbascum thapsus L.
Flannel Weed, Mullein
Roadsides and disturbed places, foothills to middle elevations.

Veronica americana Schwein.
American Brooklime
Circle Creek, springs and seeps.

****Veronica anagallis-aquatica*** L.
Water Speedwell
Streams in the valley NW of Almo.

****Veronica biloba*** L.
Speedwell
A weed of livestock bedding areas and roadsides.

Veronica peregrina L. var. ***xalapensis*** (H.B.K.) St. John & Warren
Purslane Speedwell
Streambanks and wet areas NW of Almo.

Veronica serpyllifolia L. var. ***humifusa*** (Dickson) M. Vahl.
Thymeleafed Speedwell
Along Emery Canyon Creek and at Indian Grove.

Solanaceae

****Hyoscyamus niger*** L.
Henbane
Roadside weed in upper Emery Canyon.

Nicotiana attenuata Torr. ex S. Wats.

Coyote Tobacco
Appearing for a few years on newly disturbed sites, such as roads or clearings in sagebrush.

****Solanum dulcamara*** L.
European Bittersweet, Nightshade
Introduced by dumping of waste along the wash near the east entrance of City of Rocks.

****Solanum triflorum*** Nutt.
Cutleaf Nightshade
A weed of disturbed roadside areas.

Valerianaceae

Plectritis macrocera Torr. & Gray
Longhorn Plectritis
In the rock formations and pinyon-juniper from foothills to middle elevation. Becoming very abundant when spring rains are generous.

Valeriana acutiloba Rydb. var. ***pubicarpa*** (Rydb.) Cronq.
Cordilleran Valerian
In meadows and aspen groves from Graham Peak northward.

Valeriana edulis Nutt. ex Torr. & Gray
Edible Valerian
Around Emery Canyon Well and eastward along the wash.

Valeriana occidentalis A.A. Heller
Western Valerian
Aspen thickets at Indian Grove.

Verbenaceae

Verbena bracteata Lag. & J.D. Rodriguez
Prostrate Verbena
Roadsides, especially in areas that are graded annually.

Violaceae

Viola adunca Sm. var. ***adunca***
Blue Violet
Aspen groves, grassy areas, and riparian zones at middle and higher elevation.

Viola nuttallii Pursh var. *major* Hook.
Nuttall Violet
Foothills to moderate elevations in many habitats.

Viola nuttallii Pursh var. *vallicola* (Nels.) Hitchc.
Yellow Violet
Foothills to moderate elevations.

Viola purpurea Kell.
Goosefoot Violet
Foothills to moderate elevations.

CLASS LILIOPSIDA

Cyperaceae

Carex aquatilis Wahl.
Water sedge
Riparian, mainly NW of Almo.

Carex douglasii F. Boott
Douglas Sedge
Meadows, dry slopes, roadways, and open areas from the valley to moderate elevations.

Carex hoodii F. Boott
Hood Sedge
Meadows and aspen groves.

Carex microptera Mackenzie
Smallwing Sedge
Riparian areas and springs and seeps.

Carex multcostata Mackenzie
Many-Ribbed Sedge
Meadows and riparian areas NW of Almo.

Carex nebrascensis Dewey
Nebraska Sedge
Forming thick turf in places along Circle Creek, below the springs at the Stage Station, and in Emery Canyon.
Meadows and riparian areas.

Carex petasata Dewey
Liddon Sedge
Around the base of rock outcrops in shaded but rather dry sites.

Carex praeegracilis W. Boott
Blackcreeper Sedge
Meadows and riparian areas in the valley to middle elevation.

Carex raynoldsii Dewey
Raynolds Sedge Meadows from Indian Grove northward in the mountains.

Carex rossii F. Boott
Ross Sedge
Among alpine fir at Indian Grove.

Carex vallicola Dewey
Valley Sedge
Aspen groves and open slopes at middle and higher elevations.

Eliocharis bolanderi A. Gray
Bolander Spike Rush
Edge of aspen groves north of Bath Rock and open, vernal wet slope north of Emery Canyon Creek.

Eliocharis palustris (L.) R. & S.
Creeping Spike Rush
Edges of ponds along Circle Creek and near the Stage Station.

Eliocharis pauciflora (Lightf.) Link
Few Flowered Spike Rush
Vernal streams, meadows in the valley and foothills.

Eliocharis microcarpus C. Presl.
Panicked Bulrush
Along Circle Creek.

Eliocharis pungens Vahl.
Common Threesquare
Edges of ponds and along streams.

Iridaceae

Iris missouriensis Nutt.
Missouri Iris
Meadows from the valleys to Circle Creek Basin.

Sisyrinchium idahoense E.P. Bicknell
Blue-Eyed Grass
Riparian meadows.

Juncaceae

Juncus balticus Willd. var. ***montanus*** Engelm.
Northern Rush
Meadows and seeps from the valleys to moderate elevations.
Juncus arcticus

Juncus bufonius L.
Toad Rush
Meadows and vernal wet areas.

Juncus confusus Coville
Colorado Rush
Meadows, springs, and seeps.

Juncus ensifolius Wikstra. var. ***montanus*** (Engelm.) Hitchc.
Swordleaf Rush
Indian Grove and northward in moist areas.

Juncus ensifolius Wikstra. var. ***brunnescens*** (Rydb.) Cronq.
Swordleaf Rush
Riparian areas and meadows NW of Almo. Also lower Circle Creek.

Juncus mertensianus Bong.
Mertens Rush
Along vernal stream at Indian Grove and northward at higher elevations.

Juncus torreyi Coville
Torrey Rush
At the spring near the Stage Station.

Liliaceae

Allium acuminatum Hook.
Tapertip Onion
Foothills to middle elevations in many habitats.

Allium brandegei S. Wats.
Brandegee Onion
Sagebrush grasslands and pinyon- juniper in the basins and near rock outcrops.

Calochortus eurycarpus S. Wats.
Sego Lily, Mariposa Lily
Open slopes, edges of meadows, moderate elevations.
Indian Grove.

Calochortus nuttallii Torr. & Gray
Sego Lily
Foothills to middle elevations, mostly in sagebrush.

Fritillaria atropurpurea Nutt.
Leopard Lily
Fairly common on north facing slopes in the foothills, pinyon-juniper and sagebrush.

Fritillaria pudica (Pursh) Spreng.
Yellow Bell, Spring Bell
An early bloomer from foothills to moderate elevations, numerous habitats.

Smilacina racemosa (L.) Desf.
False Solomon's Seal
Around the base of cliffs and rock outcrops.

Smilacina stellata (L.) Desf.
False Solomon's Seal
Riparian areas, often among willow thickets.

Veratrum californicum Dur.
False Hellebore, Skunk Cabbage
Moist to seasonally dry areas along streams and in higher meadows.

Zigadenus paniculatus (Nutt.) S. Wats.
Death Camus
Foothills to middle elevations in sagebrush grasslands.

Zigadenus venenosus S. Wats. var. ***venenosus***
Death Camas
Meadows in Emery Canyon.

Orchidaceae

Habenaria dilatata (Pursh) Hook. var. ***leucostachys***
(Lindl.) Ames
Bog Orchid
Riparian areas NW of Almo.

Habenaria hyperborea (L.) R. Br.
Northern Green Orchid
Lower Circle Creek in meadows. Uncommon and not
appearing every year.

Lemnaceae

Lemna minor L.
Duckweed
Common floating on the surface of still waters.

Poaceae

Achnatherum hymenoides (Roemer & Schultes)
Barkworth
Indian Rice Grass
Foothills to middle elevations on open sites.
Oryzopsis hymenoides, *Stipa hymenoides*.

Achnatherum lettermanni (Vasey) Barkworth
Letterman Needle Grass
Graham Peak on lee slope and open places at Indian
Grove. *Stipa lettermanni*

Achnatherum nelsonii (Scribner) Barkworth
Columbia Needle Grass
Open slopes and meadows from middle elevations to the
high mountains.
Stipa nelsonii, *S. columbiana*

Achnatherum nevadense (R.L. Johnson) Barkworth
Nevada Needle Grass
Open slopes, snow pockets, and meadows at moderate to
high elevation. *Stipa nevadensis*

****Agropyron desertorum*** J.A. Schultes
Crested Wheatgrass
Introduced throughout the Reserve in the old fields and
along roadways.

Agrostis exarata Trin.
Spike Redtop
Meadows, riparian, from Indian Grove northward.

Agrostis scabra Willd.
Ticklegrass
Openings in alpine fir stands and roadsides mainly from
Graham Peak northward.

****Agrostis stolonifera*** L.
Redtop, Creeping Bentgrass
Introduced and naturalized in riparian areas.

Alopecurus aequalis Sobol.
Short-Awned Foxtail
In and near small streams, especially at Indian Grove.

****Apera interrupta*** (L.) Beauv.
Windgrass
Ditchbanks and roadsides in seasonally wet areas, mainly
NW of Almo.

****Avena fatua*** L.
Wild Oats
Roadsides, fields, ditchbanks and disturbed places.

Beckmannia syzigachne (Steudel) Fern.
Sloughgrass
In standing water along Almo Creek.

Bromus carinatus Hook. & Arn.
California Brome
Aspen groves, meadows, and open slopes from middle to
high elevations.

****Bromus commutatus*** Schrader
Hairy Chess
Roadsides and disturbed places.

****Bromus inermis*** Leysser
Smooth Brome
Introduced in seedings and persisting in favorable sites,
especially at middle or higher elevations.

****Bromus japonicus*** Thunb.
Japanese Chess
Roadsides and disturbed places.

****Bromus tectorum* L.**

Downy Chess, Cheatgrass

Foothills to moderate elevations. Most abundant in burned or otherwise disturbed areas, but invading and succeeding within native communities as well.

****Dactylis glomerata* L.**

Orchard Grass

Introduced in seedings and naturalized, mostly in riparian meadows and around farmsteads. Also in sagebrush grasslands, as at Twin Sisters.

***Danthonia californica* Boland**

California Oatgrass

Moist meadows and vernal flooded areas from the valley to moderate elevations.

***Danthonia unispicata* (Thurber) Munro**

One-Spike Oatgrass

Pinyon-juniper and sagebrush grasslands. Highly palatable to cattle and only abundant therefore in seldom grazed places.

***Deschampsia danthonioides* (Trin.) Munro**

Annual Hairgrass

Along vernal streams and roadsides in wet areas.

***Deschampsia elongata* (Hook.) Munro**

Slender Hairgrass

Around springs and seeps and in meadows at middle to high elevations.

***Distichlis spicata* (L.) Greene**

Saltgrass

Saline areas along streams and in the valley. Found along the road just south of Emery Canyon/Twin Sisters junction.

***Echinochloa crusgalli* (L.) Beauv.**

Barnyard Millet

Roadsides in relatively moist places.

Elymus elymoides* (Raf.) Swezey var. *elymoides

Squirreltail Grass

Foothills to middle elevations, sagebrush grasslands and pinyon-juniper. Recurring at high elevations.

Sitanian hystrix, *Sitanian purpurea*

***Elymus glaucus* Buckley**

Blue Wildrye

Aspen groves and meadows at middle and higher elevations.

***Elymus lanceolatus* (Scrib. & J.G. Smith) Gould**

Thickspike Wheatgrass

Foothills to middle elevations, sagebrush and pinyon-juniper.

Agropyron lanceolatum

Elymus trachycaulus* (Link) Gould var. *trachycaulus

Slender Wheatgrass

Middle to high elevations in open places and aspen groves. An awned variant can be found, possibly a result of crossing with *E. glaucus*.

Agropyron trachycaulum.

Elymus trachycaulus* (Link) Gould var. *latiglume

(Scrib. & Smith) A.A. Beetle

Shady rock ledges at middle and higher elevations.

Agropyron trachcaulum var. *latiglumis*

***Elytrigia repens* (L.) Nevski**

Quackgrass

Roadsides and ditchbanks in the valleys and basins.

***Festuca confinis* Vasey**

Spike Fescue

Middle and higher elevations on open slopes and ridges.

Hesperochloa kingii, *Festuca kingii*

***Festuca idahoensis* Elmer**

Idaho Fescue

Mesic slopes and openings among aspen and mahogany at middle elevations.

****Festuca pratensis* Huds.**

Meadow Fescue

Introduced in pasture seedings and quite naturalized now in riparian areas and moist meadows.

****Festuca rubra* L. var. *rubra***

Red Fescue

An introduced pasture grass that has become naturalized in riparian areas.

Glyceria striata (Lam.) A.S. Hitchc. var. ***striata*** (Scribn.)
Fern.
Fowl Mannagrass
Springs, seeps, and streambanks.

Hesperostipa comata (Trin. & Rupr.) Barkworth var.
comata
Needle and Thread Grass
Foothills on open slopes.
Stipa comata

Hordeum brachyantherum Nevski
Meadow Barley
Meadows in the valleys and upward to moderate
elevations. Common at Emery Canyon and Indian Grove.

Hordeum jubatum L.
Foxtail Barley
Meadows and roadsides, mostly low to middle elevation.

Koeleria macrantha (Ledeb.) Schultes
Junegrass
Open slopes a middle and higher elevations.
Koeleria cristata*, *K. nitida

Leymus cinereus (Scrib. & Merr.) Love
Great Basin Wildrye
Middle and higher elevations on open slopes.
Elymus cinereus

****Lolium perenne*** L.
Perennial Ryegrass
Roadsides and meadows, mostly in the valleys.

Melica bulbosa Geyer ex Porter & Coult.
Oniongrass
Middle to high elevations in aspen groves and on open
sites.

Muhlenbergia richardsonis (Trin.) Rydb.
Mat Muhly
Valleys to middle elevations in open sites.
Common along the old roadway at Indian Grove.

Phalaris arundinacea L.
Reed Canary Grass
Riparian areas at the edge of permanent water.

Phleum alpinum L.
Alpine Timothy
Graham Peak northward in meadows and along
roadsides.

****Phleum pratense*** L.
Timothy
Meadows from the valleys to middle elevations.
Introduced in old pasture seedings and now quite
naturalized.

****Poa annua*** L.
Disturbed moist places. Common in cattle bedding areas
along Emery Canyon Creek.

Poa bolanderi Vasey
Bolander Bluegrass
Indian Grove and northward in the mountains.

****Poa bulbosa*** L.
Bulbous Bluegrass
Disturbed places in the valley and upward to middle
elevations.

Poa cusickii Vasey var. ***epilis*** C.L. Hitchc.
Cusick Bluegrass
Graham Peak and northward.

Poa nervosa (Hook.) Vasey var. ***wheeleri*** (Vasey) C.L.
Hitchcock
Wheeler Bluegrass
Aspen groves, Douglas Fir, and higher forests.

Poa pratensis L.
Kentucky Bluegrass
Valleys to mountains in many habitats. Forms a turf in
heavily grazed areas.

Poa rupicola Nash
Timberline Bluegrass
Open ridges, Graham Peak and northward.

Poa secunda Vasey
Sandberg's Bluegrass
Valleys to high elevations, assuming many forms.

***Polypogon monspeliensis* (L.) Desf.**

Rabbit's Foot Grass

Moist places from the valleys to moderate elevations. At the springs near the Stage Station.

***Pseudoroegneria spicata* (Pursh) Love**

Bluebunch Wheatgrass

Foothills to rather high elevations in sagebrush grasslands.

Agropyron spicatum

***Puccinellia distans* (L.) Parl.**

Alkali Grass

Valley meadows and roadsides, often on noticeably saline sites.

***Puccinellia nuttalliana* (Schultes) Hitchc.**

Alkali Grass

Around the spring at the Stage Station.

***Sporobolus aeroides* (Torr.) Torr.**

Alkali Sacatan

Meadows and flats in the valleys.

***Sporobolus cryptandrus* (Torr.) Gray**

Sand Dropseed

Around rock formations in open sites.

****Thinopyrum ponticum* (Podp.) Barkworth & Dewey**

Tall Wheatgrass

Seeded along roadsides and in valley pastures.

***Torreyochloa pauciflora* (Presl.) Church**

Weak Mannagrass

In standing waters along Almo and Circle Creeks.

***Trisetum montanum* Vasey**

Rocky Mountain Trisetum

Aspen and conifer forests from Indian Grove northward in the mountains.

***Trisetum spicatum* (L.) Richter**

Spike Trisetum

Open slopes and ridges at moderate and high elevations.

***Vulpia microstachys* (Nutt.) Benth. var. *pauciflora* (Scrib.) Leonard & Gould**

Annual Fescue

Soil pockets on rock outcrops, pinyon-juniper, and sagebrush. Becoming locally abundant during wet years.

***Vulpia octoflora* (Walter) Rydb.**

Six-Weeks Fescue

Among sagebrush stands. Not very common at City of Rocks.

Potamogetonaceae

***Potamogeton pusillus* L.**

Dwarf Pondweed

In slow-moving water on Circle Creek.

Typhaceae

***Typha latifolia* L.**

Common Cattail

Springs at Stage Coach Station and in riparian areas NW of Almo.

Zannichelliaceae

***Zannichellia palustris* L.**

Horned Pondweed

Growing in livestock tanks and ponds.

APPENDIX C

ANIMALS AND BIRDS OF CITY OF ROCKS

AMPHIBIANS

- ☐ Great Basin Spadefoot
- ☐ Western Toad
- ☐ Pacific Tree Frog
- ☐ Northern Leopard Frog

REPTILES

- ☐ Large-spotted Leopard Lizard
- ☐ Great basin Fence Lizard
- ☐ Northern Sagebrush Lizard
- ☐ Sage-brush Short-horned Lizard
- ☐ Desert Horned Lizard
- ☐ Great Basin Skink
- ☐ Great Basin Whiptail
- ☐ Rubber Boa
- ☐ Striped Whipsnake
- ☐ Western Yellow-bellied Race
- ☐ Great Basin Gopher Snake
- ☐ Wandering Garter Snake
- ☐ Night Snake
- ☐ Great Basin Rattlesnake

MAMMALS

- ☐ Merriam Shrew
- ☐ Vagrant Shrew
- ☐ Northern Water Shrew
- ☐ Little Brown Myotis
- ☐ Fringed Myotis
- ☐ Long-eared Myotis
- ☐ Small-footed Myotis
- ☐ Silver-haired Bat
- ☐ Western Pipistrelle
- ☐ Big Brown Bat
- ☐ Hoary Bat
- ☐ Spotted Bat
- ☐ Western Big-eared Bat
- ☐ Raccoon
- ☐ Short-tailed Weasel
- ☐ Long-tailed Weasel

- ☐ Mink
- ☐ Badger
- ☐ Spotted Skunk
- ☐ Striped Skunk
- ☐ Coyote
- ☐ Red Fox
- ☐ Mountain Lion
- ☐ Bobcat
- ☐ Yellow-bellied Marmot
- ☐ Townsend Ground Squirrel
- ☐ Richardson Ground Squirrel
- ☐ Belding Ground Squirrel
- ☐ Golden-mantled Ground Squirrel
- ☐ Least Chipmunk
- ☐ Northern Pocket Gopher
- ☐ Great Basin Pocket Mouse
- ☐ Ord Kangaroo Rat
- ☐ Beaver
- ☐ Western Harvest Mouse
- ☐ Canyon Mouse
- ☐ Deer Mouse
- ☐ Northern Grasshopper Mouse
- ☐ Desert Woodrat
- ☐ Bushytail Woodrat
- ☐ Mountain Vole
- ☐ Long-tailed Vole
- ☐ Sagebrush Vole
- ☐ Muskrat
- ☐ Western Jumping Mouse
- ☐ Porcupine
- ☐ Whitetail Jackrabbit
- ☐ Blacktail Jackrabbit
- ☐ Mountain Cottontail
- ☐ Pygmy Rabbit
- ☐ Elk
- ☐ Mule Deer
- ☐ Pronghorn

The geographic range for the above listing includes all of Almo, Idaho USGS quadrangle, and roughly lands south of the Elba-Almo divide (including the south half of Cache Peak) north from the Utah State line, east from the Junction valley Road, and west from the Jim Sage mountain crest. This list is compiled from reported sightings and probability based on range maps in Peterson's Field Guide to Mammals of America North of Mexico, Third Edition.

BIRDS

PELICAN TO WIGEON

- ___ American White Pelican
- ___ Great Blue Heron
- ___ Canada Goose
- ___ Green-winged Teal
- ___ Mallard
- ___ Cinnamon Teal
- ___ Northern Shoveler
- ___ Gadwall
- ___ American Wigeon

VULTURE TO FALCONS

- ___ Turkey Vulture
- ___ Bald Eagle
- ___ Northern Harrier
- ___ Sharp-shinned Hawk
- ___ Cooper's Hawk
- ___ Northern Goshawk
- ___ Swainson's Hawk
- ___ Red-tailed Hawk
- ___ Ferruginous Hawk
- ___ Rough-legged Hawk
- ___ Golden Eagle
- ___ American Kestrel
- ___ Prairie Falcon

PARTRIDGE TO QUAIL

- ___ Gray Partridge
- ___ Ring-necked Pheasant
- ___ Blue Grouse
- ___ Ruffed Grouse
- ___ Sage Grouse
- ___ Wild Turkey
- ___ California Quail

RAIL TO GULLS

- ___ Virginia Rail
- ___ Sora
- ___ American Coot
- ___ Sandhill Crane
- ___ Killdeer

- ___ Spotted Sandpiper
- ___ Long-billed Curlew
- ___ Common Snipe
- ___ Wilson's Phalarope
- ___ Ring-billed Gull
- ___ California Gull

DOVE TO OWLS

- ___ Rock Dove
- ___ Mourning Dove
- ___ Western Screech-Owl
- ___ Great-horned Owl
- ___ Burrowing Owl
- ___ Long-eared Owl
- ___ Short-eared Owl
- ___ Northern Saw-whet Owl
- ___ Northern Pygmy-Owl

NIGHTHAWK TO HUMMINGBIRDS

- ___ Common Nighthawk
- ___ Common Poorwill
- ___ White-throated Swift
- ___ Black-chinned Hummingbird
- ___ Calliope Hummingbird
- ___ Broad-tailed Hummingbird

KINGFISHER TO WOODPECKERS

- ___ Belted Kingfisher
- ___ Red-naped Sapsucker
- ___ Downy Woodpecker
- ___ Hairy Woodpecker
- ___ Northern Flicker

FLYCATCHERS

- ___ Olive-sided Flycatcher
- ___ Western Wood-Pewee
- ___ Willow Flycatcher
- ___ Hammond's Flycatcher
- ___ Dusky Flycatcher
- ___ Gray Flycatcher
- ___ Cordilleran Flycatcher
- ___ Say's Phoebe

- ☐ Ash-throated Flycatcher
- ☐ Western Kingbird
- ☐ Eastern Kingbird

LARK TO SWALLOWS

- ☐ Horned Lark
- ☐ Tree Swallow
- ☐ Violet-green Swallow
- ☐ Northern Rough-winged Swallow
- ☐ Bank Swallow
- ☐ Cliff Swallow
- ☐ Barn Swallow

JAYS TO RAVEN

- ☐ Steller's Jay
- ☐ Western Scrub Jay
- ☐ Pinyon Jay
- ☐ Clark's Nutcracker
- ☐ Black-billed Magpie
- ☐ American Crow
- ☐ Common Raven

CHICKADEES TO GNATCATCHER

- ☐ Black-capped Chickadee
- ☐ Mountain Chickadee
- ☐ Plain Titmouse
- ☐ Bushtit
- ☐ Red-breasted Nuthatch
- ☐ White-breasted Nuthatch
- ☐ Brown Creeper
- ☐ Rock Wren
- ☐ Canyon Wren
- ☐ House Wren
- ☐ Winter Wren
- ☐ Golden-crowned Kinglet
- ☐ Ruby-crowned Kinglet
- ☐ Blue-gray Gnatcatcher

THRUSHES TO STARLING

- ☐ Mountain Bluebird
- ☐ Townsend's Solitaire
- ☐ Swainson's Thrush
- ☐ Hermit Thrush
- ☐ American Robin
- ☐ Sage Thrasher
- ☐ Bohemian Waxwing
- ☐ Cedar Waxwing
- ☐ Northern Shrike

- ☐ Loggerhead Shrike
- ☐ European Starling

VIREOS TO CHAT

- ☐ Solitary Vireo
- ☐ Warbling Vireo
- ☐ Orange-crowned Warbler
- ☐ Virginia's Warbler
- ☐ Yellow Warbler
- ☐ Chestnut-sided Warbler
- ☐ Yellow-rumped Warbler
- ☐ Black-throated Gray Warbler
- ☐ MacGillivray's Warbler
- ☐ Common Yellowthroat
- ☐ Wilson's Warbler
- ☐ Yellow-breasted Chat

TANAGER TO TOWHEES

- ☐ Western Tanager
- ☐ Black-headed Grosbeak
- ☐ Lazuli Bunting
- ☐ Green-tailed Towhee
- ☐ Spotted Towhee

SPARROWS TO BUNTING

- ☐ American Tree Sparrow
- ☐ Chipping Sparrow
- ☐ Brewer's Sparrow
- ☐ Vesper Sparrow
- ☐ Lark Sparrow
- ☐ Sage Sparrow
- ☐ Savannah Sparrow
- ☐ Fox Sparrow
- ☐ Song Sparrow
- ☐ White-crowned Sparrow
- ☐ Harris' Sparrow
- ☐ Dark-eyed Junco
- ☐ Snow Bunting

BOBOLINK TO HOUSE SPARROW

- ☐ Bobolink
- ☐ Red-winged Blackbird
- ☐ Western Meadowlark
- ☐ Yellow-headed Blackbird
- ☐ Brewer's Blackbird
- ☐ Brown-headed Cowbird
- ☐ Bullock's Oriole
- ☐ Scott's Oriole

☐ Black Rosy Finch
☐ Cassin's Finch
☐ House Finch
☐ Red Crossbill
☐ Pine Siskin
☐ American Goldfinch
☐ Evening Grosbeak
☐ House Sparrow

APPENDIX D

LITERATURE ON NATURAL RESOURCES

GEOLOGY

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APPENDIX E

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